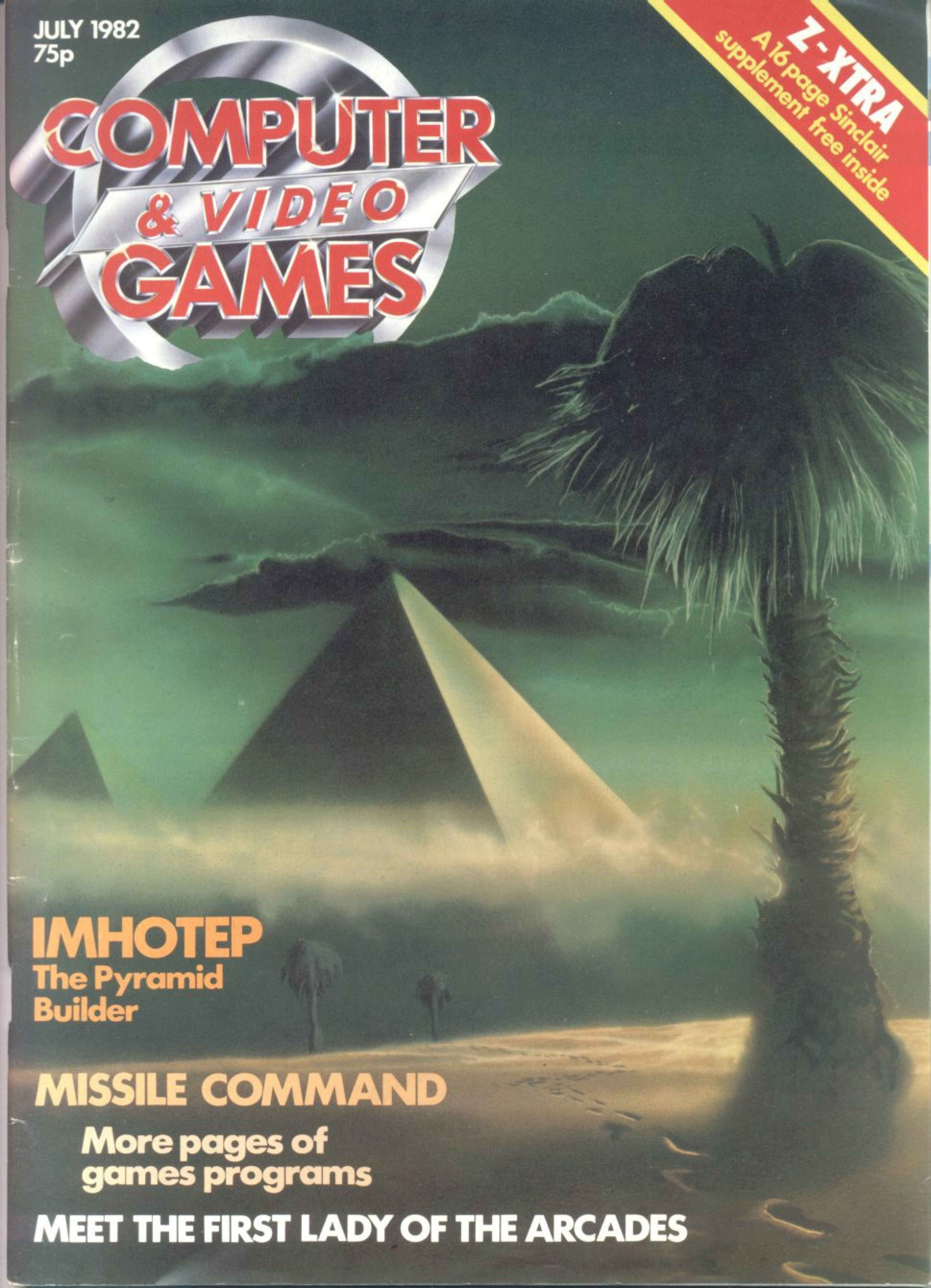
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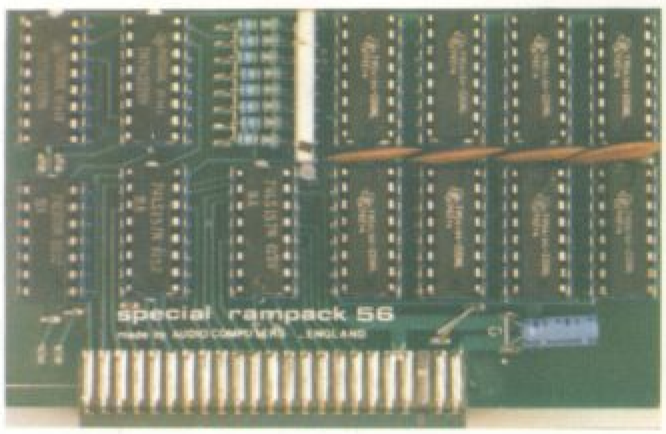
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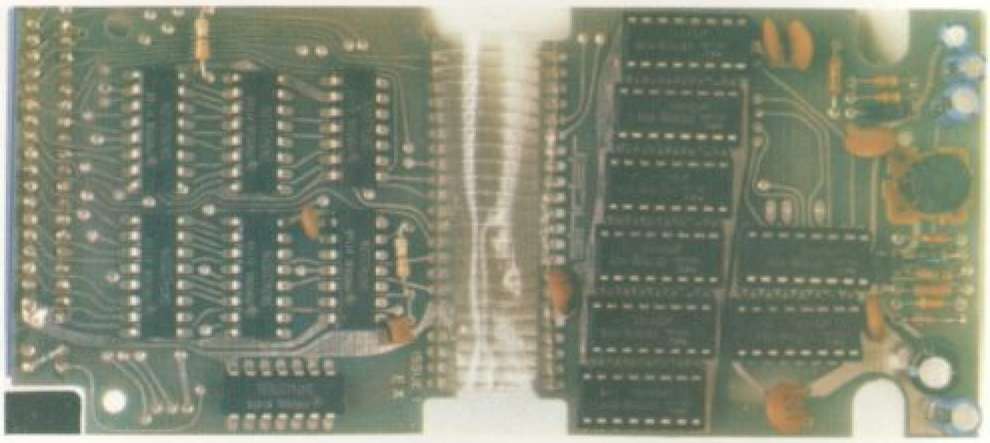
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COMPUTER & VIDEO GAMES

CONTENTS

JULY 1982 No 9



Ms Pacman . . .

The video games people play are geared towards the male section of the playing population. All you usually see and hear are missiles and projectiles whizzing at the speed of light towards their victims. Or else there are swarms of mutant aliens being blasted with high powered laser guns. All the sort of stuff tough little boys were brought up on.

All that is now changing with the help of Ms Pacman, the latest "cute" game out in America. It is supposed to be particularly appealing to the gentler sex. We decided to find out what British video games distributors are doing for their female playing public, and whether they are giving girls want from video games. See page 73.

News & Reviews

Listings







Features

Editor Terry Pratt, **Assistant editor** Elspeth Joiner, **Editorial assistant** Susan Cameron, **Design** Linda Freeman, **Production editor** Tim Metcalfe, **Advertisement manager** Rita Lewis, **Advertising executive** Neil Wood **Advertisement assistant** Louise Flockhart, **Publisher** Tom Moloney

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VIC-20

Bombs Away
Fly your bomber across the landscape and avoid the anti-aircraft fire. Release your bombs and try to destroy the enemies gun positions. £7.95

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Calculate payments, interest rates, remaining balances, future balances and other variables of the classic interest formulas. Calculates any unknown given the other variables of the classic interest formulas. Screen prompts step you through each calculation after selecting your purpose from a master menu. £9.95

Reversal
The VIC acts as the board and judge in a two player strategy game. Flank your opponents pieces and see them convert to your colour. Excellent game of strategy and skill. VIC acts as your opponent. 8k expansion required. £10.95

Target Moon
Another hand / eye coordination game involving a manoeuvrable cannon which you use to shoot down various targets. Excellent use of colour and sound. £7.95

Capture
Draw the robots into the landmines and electrified fences while avoiding their sole purpose which is to capture you. Who will win? £7.95

Math Drill
Generates simple addition and subtracton problems for the young user. Uses giant numbers on the screen and rewards correct answers with a colourful display. £7.95

Biorhythm
8k expansion required. Enter your name and birthdate and the day you wish your chart to begin. The VIC will plot three weeks of biorhythms for you on the screen and then pause until you tell it to proceed or start a new chart. Your physical, intellectual and emotional cycles are plotted in different colours which really create an interesting and informative display. £9.95

Household Inventory
8k expansion required. This program will create and manage a household inventory for insurance purposes. Tracks purchase date, cost, description and location. Will total values and print to screen or printer. £14.95

Data Manager
8k expansion required. Allows you to create and manage your own data base. You can define the number of items in a record and add, change, display, delete, search, sort, print, etc. Your data can be stored on cassette when not in use. £17.95

Stock Portfolio Manager
8k expansion required. Tracks last 6 values of each stock and plots trend curves on screen. Provides complete analysis of your portfolio including number owned, purchase date, cost, value, appreciation, yield, etc. £17.95

Moon Lander
This game allows the 'Astronaut' to take over the controls of a Lunar Excursion Module as it is making its descent to the moon. The program provides information via screen displays depicting amount of propulsion, fuel remaining, height and descent speed. In addition the LEM is displayed as it descends to the surface. If the astronaut is not careful, the module can be damaged or even totally destroyed upon impact. £7.95

Wrap
This is a two player game requiring manual skill and dexterity as you attempt to trap your opponent and force him to 'Crash'. The VIC will act as your opponent if you desire. £7.95

Bricks
This game requires skill as you attempt to knock out the various coloured bricks without missing the returning ball. The deeper you succeed in breaking into the wall the higher the value of your score until you break through and truly increase your score. See who can get the highest score. Joystick version. £7.95

Blackjack
Las Vegas style blackjack with the VIC serving as dealer. Two players can play against the house (VIC) utilizing such strategy as 'Doubling Down' and controlling your bets. Each card is displayed on the screen in full colour. The VIC provides an easy way to develop your 'SYSTEM' before actually going to the tables. £7.95

Tennis
The standard game of Paddle tennis with the option of the VIC playing one or both sides of the net. Excellent use of the colour and sound capabilities of the VIC. £7.95

Slots
Try your hand at this 'One Armed Bandit'. See the wheels spin and the handle pull utilizing the VIC's colour and sound capabilities. You can really get arm weary pumping in your money. £7.95

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The Aliens are invading the Earth and it is up to you to destroy them before they land. The tension increases as you try to accumulate a high score. Joystick version. £7.95

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WIN A PIN

NEXT MONTH

How would you like to win a pin? Bally has long perched at the top of the pinball manufacturers' tree and is offering one of its marvellous machines to the readers of **Computer & Video Games** magazine.

Today's pinballs are a long technological leap from the machines which dominated cafe society in the 1950s and 60s. Their brilliant fantasy backsplashes alone are in great demand, the skill features like drop targets, split-level playfields, captive balls and multiple flippers, make them formidable and fascinating opponents. And some of them even talk!

Next month we'll publish the competition for you to enter but first you'd better check with your Mum, wife, husband or flatmate to see if they'll let you.

Talking of Mums and wives, where do they stand as men push back the home computer frontiers. Research proves the personal computer field to be a male-dominated domain. But the tale of the Computer Widow shows the view from the other side. Could



this be the start of a Computer & Video Games' woman's page?!

Haunted House, a spooky adventure for the not-too-nervous, is the pick of our games listings for August and features on the front cover of that issue.

Our readers know we like to be first with everything — so true to form we've got a Spectrum game hot off the Sinclair printer.

ZX81 owners will be able to take their computers on a hunting trip and for space fans with a VIC-20 we've got a game called Rocks — an arcade style asteroids adventure.

Watch out for the next issue at your newsagents or order your copy now by filling in the subscription form below.

I would like to take out an annual subscription. I enclose a cheque/P.O. for £10, (£20 overseas) for twelve issues. Computer & Video Games, Bretton Court, Bretton, Peterborough PE3 8DZ.

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FLY ME AN OWL

Owl suffered a setback on his first flight out last issue.

Due to production problems beyond our control, the BBC Microcomputer supplement was late getting to the newsagents — only a matter of days but those first days are important ones in anything's life.

If you missed out on a copy of our 16 page supplement please fill in the form right and make use of our freepost facilities to make sure of your copy.

Fill in the form and address an envelope to Computer & Video Games Owl Supplement, Freepost, Bretton, Peterborough PE3 8BR.

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WANTED: A WRITER FOR C&VG

We keep pinching ourselves, expecting to wake up and find we aren't really working for a magazine called Computer & Video Games at all.

If it sounds your idea of a dream job, why not write in and apply for the job of staff writer on the magazine.

This vacancy needs to be filled quickly and we thought we should give our readers an opportunity to show us what they could do for the magazine.

If you are interested, write in and give us as full a picture of yourself as you can: academic qualifications, age, where you come from, details of computer or previous writing experience, work experience, why you would like to work for this magazine and what you feel you could bring to it. Go to town, the more we know about you, the keener we'll be to have you working alongside us.

If you could, also include an article, you have written yourself, which you would like to see in this magazine. Whether it's a game review, a day at the local arcade or a detailed analysis of the problems of programming Sicilian Defence into your ZX81's chess program, it will help us gauge your writing style and ability.

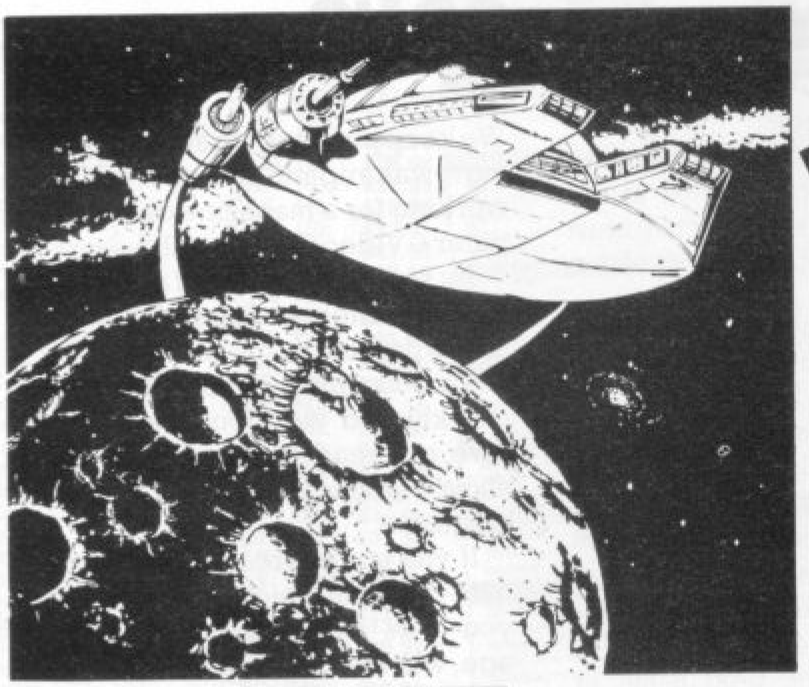
Writing ability and a good knowledge of the English language are important but we are also looking for someone with an enthusiasm for home computers and gaming in all its various forms.

To introduce a note of realism back to this dream, Computer & Video Games staff writers do not spend all their time playing games. This post is a responsible position and involves a lot of hard work and long hours as the present writer will testifiy.

We are not sure what sort of response we will get to this request but if we are snowed under, it may not be possible to draft out a proper reply to everyone. So please do not be too disappointed if you just receive a short letter back saying that we do not think you are suitable.

ZX81 ..... B.B.C. MICRO ..... ATOM VIC

BBC SPACEWARP



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ZX81

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ZX81 ..... B.B.C. MICRO ..... ATOM VIC



Please drop us a line at: Computer and Video Games, EMAP, Durrant House, 8 Herbal Hill, London EC1R 5JB.

CRACKING THE CODE

Dear Sir,
For three months I have been the proud owner of a VIC-20 computer which I have found very useful, especially for games programming.
I am, I think a competent Basic programmer and, therefore decided to attempt to learn Machine Code for the VIC.

Since that time I have spent many bewildered hours reading through VIC Revealed by Nick Hampshire and have so far learned nothing.

Is there an alternative book which caters for newcomers to machine code?

G. Freeman
Benfleet
Essex

Editor's reply: Commodore itself produces a Machine Code Monitor cartridge which comes complete with a book and helps the user get to grips with 6502 assembly language.

BAFFLED ADVENTURER

Dear Sir,
I was most interested at the thought of being able to write my own adventure after buying the first issue of **Computer and Video Games.** But to my dismay, in further issues they seemed to leave me behind as they went into LEN, RIGHT$, LEFT$, and mid$ statements without explaining anything about them and I cannot find them in any BASIC guide book.

After that they seemed to leave me further behind without any explanation of why you should set it out in a particular way and how to get the computer to do what you exactly want, with a sort of "You must do this otherwise it doesn't work" attitude. I found this quite annoying.

Both my friends and I found this most baffling and hope you will maybe include an extra page for the Adventure explaining the use of the statements etc.

M. Godfrey,
Leigh-on-Sea,
Essex

Keith Campbell replies: The statements you mention are standard Microsoft 8080 BASIC and have the following meanings:

LEN(X$) — returns the character length of the string held as variable X$.

RIGHT$(X$,Y) — returns the Y rightmost characters of the variable X$.

LEFT$(X$,Y) — returns the Y leftmost characters of X$.

MID$(X$,Z,Y) — takes Y characters from X$, starting at position Z.

These statements are illustrated by the program below.

I did mention in the December issue that your computer would need similar statements to effectively program Adventure, which involves a lot of string manipulations. Unfortunately, it is beyond the scope of my brief and the space available to explain the BASIC language as well as a particular programming applicaion.

As regards getting the computer to do exactly as required, every programmer will have different views on the precise method of coding.

My articles aim to explain a basic technique, leaving the reader to think through the logic in detail. I try to point out some of the likely pitfalls,

For example, in the February issue I suggested that the verb "GO" would have to be padded out with a blank or an error would result in the setting of R4$. This, I hoped, would be sufficient for the reader to deduce that to find the 3 leftmost characters of a string of length 2 would cause a computer error!

```
10 REM Demonstration of
   LEN, RIGHT$, LEFT$,
   MID$
20 LET X$="COMPUTER &
   VIDEO GAMES"
30 LET Y=5
40 LET Z=12
50 PRINT LEN(X$)
60 PRINT RIGHT$(X$,Y)
70 PRINT LEFT$(X$,Y)
80 PRINT MID$(X$,Z,Y)
90 END
```

THE FETE OF DEFENDER

Dear Sir,
As an avid Defender player I am wondering if there is such a game available for the ZX81 apart from Quicksilva's version.

Also, although I appreciate the Research Machine 380-Z is not a cheap computer, would it be possible to print an arcade style game suitable to be used at my school fete later in the year.

Simon Ray,
Ipswich,
Suffolk.

Editor's reply: Quicksilva seems to be the only firm with a version of Defender in its catalogue at present.

If you turn to page 38 you will find a program listing of Missile Command which runs on a Research Machines 380-Z computer. Perhaps you could use that at your school fete.

SOLUTIONS ON APPLE

Dear Sir,
I would like to help Apple users to get the most out of their computers by giving some solutions to the problems that Paul Cainey has written to you about in your May edition Mailbag.

The problem that Paul had with sound is easy to solve. All he needs is this sub-routine:

```
5000 POKE 768,160:POKE
  769,255:POKE 770,162
5010 POKE 771,160:POKE
  772,202:POKE 773,208
5020 POKE 774,253:POKE
  775,173:POKE 776,48
5030 POKE 777,192:POKE
  778,136:POKE 779,208
5040 POKE 780,245:POKE
  781,96
5050 NOISE=768:
  PIT=771:DUR=769
```

To get a sound you:POKE PIT, (PITCH 1-255) :POKE DUR, (DURATION 1-255): CALL NOISE

To get good sound effects you should use loops which change PIT or DUR. The sound which I find is good for a laser is:

```
FOR I=1 TO 100 STEP 5:
POKE DUR, 2:POKE PIT,
I:CALL NOISE:NEXT I
```

If you don't find that satisfactory you can change DUR or the loop or try to make your own sound. There are thousands of possibilities!

A. M. Storr,
Holbrook,
Derbyshire.





ADDING TO THE ZX81

Dear Sir,
I am another lover of your front cover pictures, especially April's Medusa pinball machine.

The main reason, however, for writing to you is to ask you about the compatibility of two add-ons for the ZX81.

Supposing someone who wanted two add-ons — in my case these are the DK'tronics graphics ROM and the Micro-Gen joysticks — wanted to use them together. How do you know whether it will work?

Could you please tell me if the above two add-ons will work in conjunction with one another, and how to find out whether any two will work together, as I am sure this is not an uncommon problem.

Jonathan R. Perkin,
Stoke-on-Trent,
Staffordshire.

Editor's reply: The DK'tronics graphics ROM resides at 8K–12K in the ZX81 memory map. If your add-ons use particular part of memory then you will have problems. One case where this is true is Technomatics I/O port. Two add-ons will work with each other but obviously not in the same area of memory. For the smaller add-ons such as graphics or sound boards motherboards are available from several companies including Quicksilva.

EXPANDING BEYOND 16K

Dear Sir,
I am writing this letter in the hope that you will publish all, if not, part of it as a warning to all ZX81 first-time owners/users who are contemplating expansion beyond 16K.

On the surface the series of 32, 48, 64 and 128K units do appear to be the answer. Once the decision is taken and your money is down — the simplicity ends right there!

After a wait of five weeks my 64K unit arrived. Enclosed were two single-sided sheets of foolscap size instructions and advice.

The unit was well made and very professional in appearance but it took me ten days to discover that it was *probably* faulty. The main problem was that I was simply not advanced enough in programming or user capability to be able to decipher the instructions.

Where the unit should have accepted "DIMA (9000)" it would only accept a maximum of "DIM A(4716)". Next was a "SIMPLE RAM TEST PROGRAM" which gave an "ERROR AT" every byte. I entered "CONTINUE" each time it stopped for 100 bytes. I gave up on this too!

The final section dealt with "CONFIGURATION OF THE ? MEMORY SWITCHES". MODE 1 states "THIS MODE PROVIDES 64K OF MEMORY AND IS FOR FUTURE DEVELOPMENTS". This statement worried me because I was under the very definite impression that I *had* a 64K facility available *now*! Though you have probably guessed the name of the firm concerned I have deliberately avoided stating it as they have yet to have their say. However, in no way can they be exonerated for making a complete mockery of the concept of the ZX81. I will be posting the unit back at the same time as this letter.

No matter what the final outcome is, I am left wondering how many ZX81 owners are now composing very rude letters to the manufacturers concerned.

R. N. Leathers,
Bassingbourn,
Nr. Royston,
Herts.



ANNOYING HABITS

Dear Sir,
Being the reasonably proud owner of a ready built Sinclair ZX81, I have recently discovered an annoying habit the machine possesses. I purchased the computer about five months ago and now it refuses to edit any lines of a program after being in operation for an hour or more.

You can imagine the frustration this can cause when one has to type out whole lines in order to get rid of the odd six legged nasty! I would be interested to know if anyone else has the same problem

I assume that I am operating the machine correctly — SHIFTED ONE — to bring down the line notified by the cursor.

If this fault cannot be rectified or it happens to be a trait of the machine, this is inclined to make me apprehensive about purchasing software etc. I have written to Sinclair Research about this problem at the same time I am writing to you and I will forward any reply I receive!

By the way I discovered your magazine by accident in a local newsagent and find it both entertaining and informative. I shall be placing a regular order for the future. Thank you for a breath of fresh air!!!

D. McRiner,
Sumburgh,
Shetland.

Editor's reply: This is a recurring problem. I have experienced the same difficulty, but on a number of other keys as well. It could be a number of things.

The leads from the keyboard to the main computer sometimes get loose, especially as the cursor editing keys are very close to where the leads join. To edit, by the way, use the cursor control keys on 6 and 7 to move the up and down after a LIST. Then push shifted ONE to bring the line down.

PICTORIAL POSER

Dear Sir,
There are many visually handicapped owners of micros nowadays who depend on the computer press as a source of information and programs. Being of independent natures, most of us like to read for ourselves using visual aids rather than rely on another person to read out loud. Most of the popular magazines provide reasonably clear print, but I'm afraid that **Computer and Video Games** has to come bottom of the list by your habit of providing pictorial backgrounds not only to articles but to program listings.

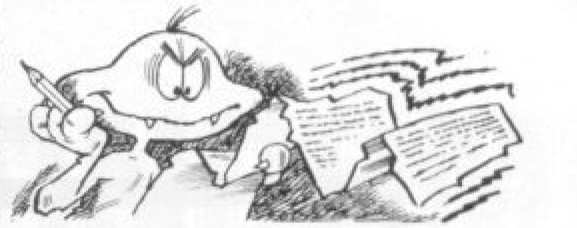
Perhaps the worst example to date is in the Adventure series in the April issue where text is in black on a dark grey background.

P. V. Bamfield,
Brighton,
East Sussex.

Editor's reply: Point taken Mr Bamfield; we will try to curb our artistic excesses but please allow us to slip the odd illustration under copy to keep our design lively.



MAILBAG



DELIGHTFUL LISTINGS

Dear Sir,
Having decided to purchase an Atari 800 some four months ago, I was absolutely delighted to discover **Computer and Video Games** and, in particular, to find the Atari program listings. The Trench program is an education in graphics, as is Golf, both of which were well worth the effort involved in punching the keys.

Changing Hearts proved to be more of a detective story until I deduced that there must be an error in line 40, defining G$. The correct expression is G$="ABDE,ABC, ,BCEF,ADG, ,BDEFH,CFI, ,DEGH,GHI, ,EFHI," all with control pressed for the characters between the quotes.

Experience of punching in programs from a number of magazines shows that the first place to look is for errors in punching the keys — Atari line by line error messages help a lot here — but if everything else fails, check any related material in the descriptive text.

By the way, the plastic ruler really is a great help when entering programs but it is quite good for scratching your head when you are trying to find the bugs in the software.

I'm keen to see you publish a guide to the differences between varieties of BASIC. I would love to convert some of your listings to run on my machine. Treasure Hunt looks very easy!
Nigel H. Hughes
Fleet
Hampshire

OF PEEKS AND POKES

Dear Sir,
I was most pleased to see such a long Star Trek program featured in the March issue of your magazine but towards the end of it I noticed the usual problem, PEEKS and POKES.

I know that you have said before that publishing conversion tables was not practical, but I have found your magazine next to useless as far as the program listings I would like to try are concerned because of the inclusion of these commands.

Perhaps you could at the end of each issue give conversions for just those PEEKS and POKES appearing in that issue, or could devote one page each month to conversions so that the tables can be collected by the many people, who, like me, are learning about PEEKS and POKES. Perhaps you could even print a special issue of conversion tables at some time in the future, although it might be easier still if you publish only those programs that avoid PEEK and POKE altogether.

If for some reason none of these suggestions are practical could you give suggestions as to what books I would have to buy to do my own conversions between the machines you cover. I have a BBC machine.
P. Crossley
Hornchurch
Essex

Editor's reply: Moira Norrie's *Down to Basic* series is currently detailing the intricacies of Basic on individual machines.

PEEKS and POKES do present a more complicated problem but as they are responsible for many of the more interesting graphic and sound features on many machines, it is too limiting to dismiss programs that contain them.

David Lien's *The Basic Handbook* by Compusoft publishing is the tome we usually recommend to help with conversion problems but our copy unfortunately doesn't contain any references to the BBC Microcomputer.

MORE TIPS ON CRESTA

Dear Sir,
Regarding your Moon Cresta tips section in the March 1982 issue, I find that you have missed what I consider the most important tips on this machine:
1. The second screen of Cold Eyes — the first type of alien — the yellow ones, will loop underneath and blow up anyone who hides for any length of time in the bottom left hand corner. To evade, move to the right as the alien starts it's last loop.
2. On many machines, after completing two successful missions the last one of each type of alien becomes faster, much faster than your ship.
3. Docking occurs after the meteorites if all three ships are intact, so get in the middle of the screen after the 8th pair.
4. The last 4 D will materialise at the top of the screen, then become invisible until the bottom of the screen. However, it never goes into the left hand corner, making this very safe.
Ian Bland
St. James
Northampton

BINDERS ON THE WAY!

Dear Sir,
I have enjoyed your magazine, right from number one, and as you can imagine they are getting a bit of a muddle, so could you tell me if you have any plans for releasing a binder for them.

Also how about reviewing some old computers? — by that I don't mean ancient models, just the ones that have been on the market for some time. I have been trying to find a review of the Sharp MZ-80K but without luck.
T. Day,
Cherry Hinton,
Cambridge

Editor's reply: In the near future we are going to review some of the other computers in our Hardcore section. Regarding the binders for the magazine, we are in the process of getting these organised and they will be available in a few months' time.

VIC FAN'S QUESTIONS

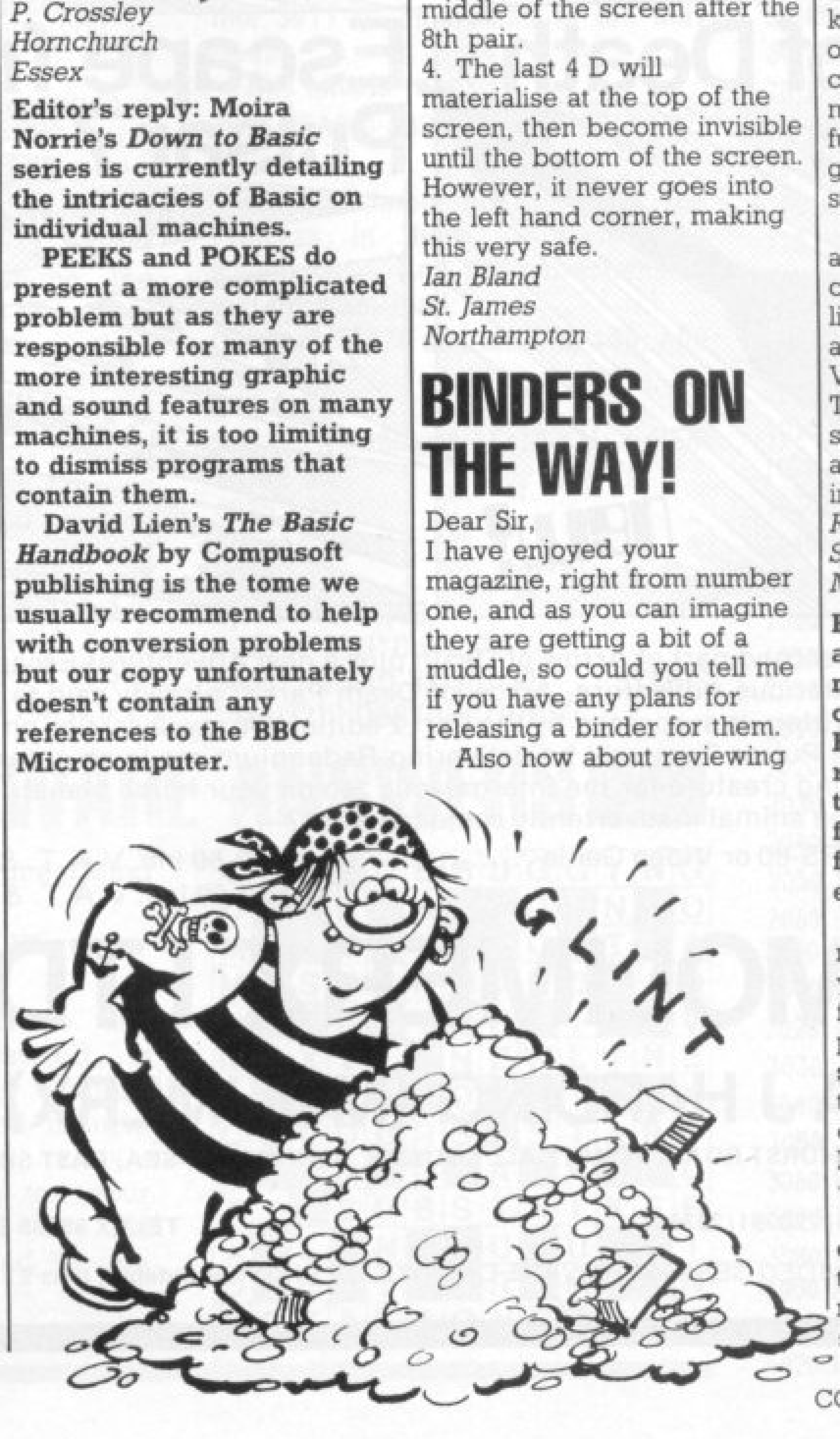
Dear Sir,
I am a proud owner of a VIC-20 and have three questions to ask. Firstly, I would like to know if complex games of 16K or above will be available on cartridge without expanded memory i.e. the cartridge is the full memory needed to play a game, such as aircraft simulation.

Secondly, what are the advantages of cartridges over cassettes? And finally are there likely to be any modern arcade games available for the VIC-20 such as Defender, Tempest or Galaga which offer superb sound and graphics and would easily find a place in anyone's software library.
Richard Brayshaw
Southport
Merseyside

Editor's reply: Adventures are considered among the most memory-consuming and complex of computer games, Richard, and Commodore is releasing a series of five of the better-known adventures for the VIC-20 in cartridge form which will not need any expansion.

Although Commodore will not be releasing the games you mention in the near future, the company is producing a large range of software closely following the arcade trends. Versions of recent arcade successes like Gorf and Omega Race will be available soon.

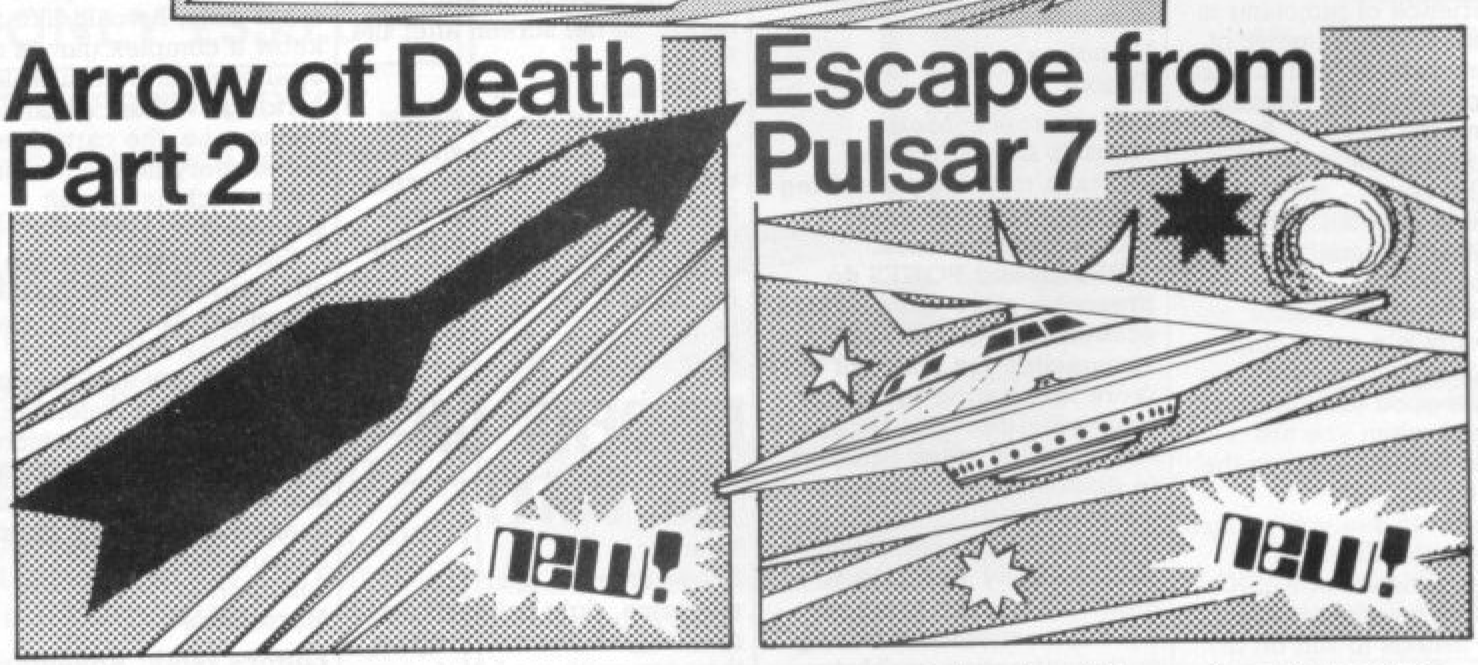
The main advantage of cartridges over cassettes is that no extra memory is needed to play quite sophisticated games.



INNOVATIVE
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from the professionals

Mysterious Adventure





NOW — The second part of Arrow of Death plus a new Adventure! Escape from Pulsar 7 is the first space Mysterious Adventure. Arrow of Death Part 1, already said to be one of the best 16K Adventures written, is surpassed by the Part 2 edition. Arrow 2 carries on from Arrow 1 but is self-sufficient. In Pulsar 7 you will be delivering Redennium ore to an outer galaxy when you pick up an interesting creature for the intergalactic zoo on your home planet, but what happens when the ore and the animal inadvertently come together?

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YES YOU CAN BEAT THE BUGS' PUZZLE

Could you Beat-the-Bug in the give-away puzzle on the front of our June issue?

A BBC Microcomputer goes to the writer of the best computerised solution we receive but the puzzle can also be solved by good old fashioned brain power.

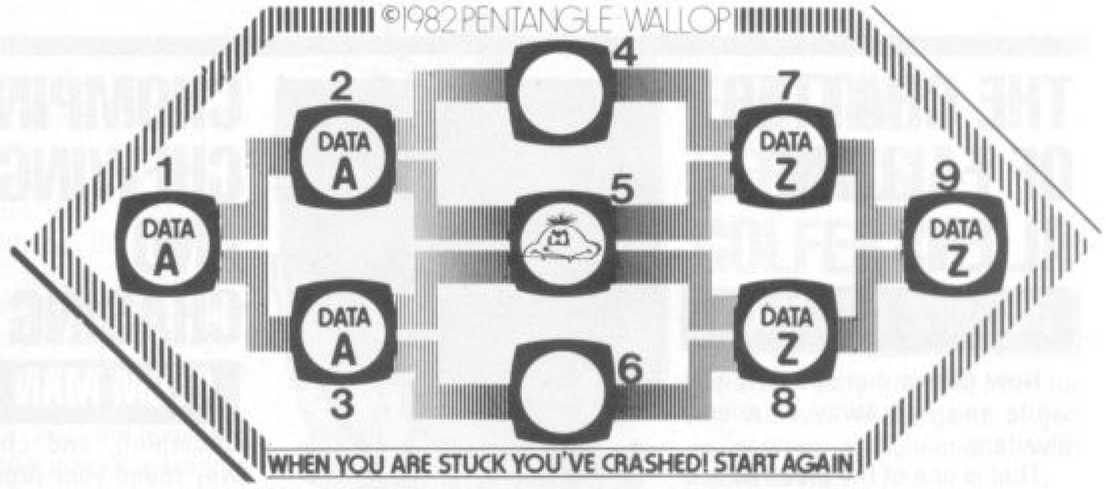
In all there are eight solutions if you count the first movement of two pieces of Data as one move. But all eight are just variations of each other with the Bug's first move dictating the rest of the solution.

If you found the puzzle beyond you, we have notated a solution below which should help you to solve it.

We have given each position a number (as indicated to the right) and the "Z" stands for Data Z; the "A" for Data A; and the "B" for the Bug's moves.

Using these abbreviations, the solution is demonstrated by: showing which piece is moving, then giving the position it presently holds and the new position it is moving to. So A 2-5 means that the piece of Data A on position 2 moves to position 5 — the central square.

Z 7-4; Z 8-6; B 5-8; Z 9-7; B 8-9; A 2-5; B 9-8; Z 4-2; B 8-9; Z 7-4; B 9-7; A 5-8; B 7-9; A 3-5; B 9-7; A 1-3; B 7-9; Z 2-1; B 9-7; Z 4-2; B 7-4; A 8-9; B 4-7; A 5-8; B 7-4; A 3-5; B 4-7; Z 6-3; B 7-4; A 5-7.



Confessions of a Bug

We Bugs have done the dirty on Acorn Atom owners for the last couple of issues. First there was a barely noticeable little flaw which crept into line 3011 of Spiderman in the May issue.

This should read:

```
3011 IFA?(0+32) 32 and A?(0+32)
64G.d
```

We also tampered with Save The Princess in June — well, who wouldn't? — and the corrections to that program read:

Delete line 270 and the first 145. Add lines:

```
240 G.300
250   ?A=32;A=A+C;?A=M;   REM
MOVE ME
4025 I=0
```

Change lines:

```
4040                A?(I*C)=32;?(S-
9)=B+48;G.100
4020 IF A?(I*C)=E;V=V
5050   P.$(D-32)$(U-32)''   STAIRS
''$(0-32)'' OBSTRUCTIONS'''
```

But perhaps our biggest coup was the smuggling away of the Go program from June. The program which turns your T.V. screen into a Go board, is featured below.

```
10 REM MICROGO Main Routine
20 DIM B$(9,10)
30 REM initialise board
40 GOSUB 1000
50 REM display entire board
60 GOSUB 2000
70 REM accept move
80 GOSUB 3000
90 IF C$="F" THEN GOTO 980
100 REM store move
110 GOSUB 4000
120 GOTO 50
980 STOP
990 GOTO 50
1000 REM Initialise Board Subroutine
1010 FOR Y=1 TO 9
1020 FOR X=1 TO 9
1030 LET B$(Y,X)="+"
1040 NEXT X
1050 LET B$(Y,10)=CHR$(Y+CODE"0")
1060 NEXT Y
1070 RETURN
2000 REM Display Board Subroutine
2010 PRINT AT 0,0
2020 FOR Y=1 TO 9
2030 PRINT B$(Y)
2040 NEXT Y
2050 PRINT "123456789"
2060 RETURN
3000 REM Accept Move Subroutine
3010 PRINT AT 20,1 ;"COMMAND? "
3020 INPUT C$
3030 IF C$="F" THEN GOTO 3080
3040 PRINT AT 20,1 ;"X?        "
3050 INPUT X
3060 PRINT AT 20,1 ;"Y?        "
3070 INPUT Y
3080 RETURN
4000 REM Store Move Subroutine
4010 LET B$(Y,X)=C$(1)
4020 RETURN
```

yours Mal

BRAINWARE ANSWERS

The answer to our June Mind Routines problem is:

SRHWUVXDIFKNMCBLOJY-EAPTQG

The correct solution to last month's Nevera Crossword is printed right and the winner's names will be published in next month's issue.

For more puzzles to tax your brain turn to page 71 for this month's Mind Routine and Nevera Crossword.

C	O	S	■	D	E	B	U	G	G	I	N	G
O	■	■	R	■	N	■	■	O	■	N	■	O
M	■	■	O	■	T	■	■	O	■	T	■	A
M	A	S	T	E	R	M	I	N	D	■	I	D
U	■	■	A	■	Y	■	R	■	I	■	■	V
N	E	X	T	I	■	N	E	W	L	I	N	E
I	■	■	I	■	■	O	■	■	I	■	■	N
C	O	L	O	U	R	S	■	S	T	A	R	T
A	■	■	N	■	O	■	A	■	H	■	■	U
T	T	■	S	U	B	S	T	R	I	K	E	R
I	■	L	■	N	■	■	U	■	U	■	■	I
O	■	E	■	I	■	■	R	■	M	■	■	N
N	O	T	A	T	I	O	N	S	■	B	U	G

GAMES NEWS

THE CHATTER OF FALLING ALIENS

DEFENCE COMMAND



Now games can speak to you while you fire away at enemy invaders.

That is one of the features of a recently introduced game Defence Command. Hordes of aliens coming in a plethora of shapes, sizes and animosity are attacking your planet's fuel sites.

You are put in charge of defending these vital supplies from the enemy force and must destroy them before they land on one of the line of fuel tanks and try to whisk them away.

All is not lost if one of the attackers manages to reach a fuel can. You can wipe him out as he makes good his escape but it can be tricky if you leave it too late. After killing the alien you must catch the fuel can as it falls from the creature's clutches.

At certain points in the game a synthesised voice bleats at you — but never to offer peace.

Defence Command runs on the TRS-80 and the Video Genie with 16K memory space. It costs £10.95 with an extra 70p for postage and packing and can be bought through dealers or mail order from the London based Essential Software Company.

CHOMPING, CHEWING AND CHASING



ATOM MAN

Chomping, and chewing their way round your Atom are lots of little Atom men.

The Atom men are dangerous beasts infamous for their overactive jaws and very healthy appetites. Atom Man is the latest version of Pacman for the Acorn Atom computer and its producers Hopesoft say little has been sacrificed from the original successful arcade game.

You control one muncher who runs along the paths of the maze eating up the dots lining them. The five Atom Men are usually in pursuit of you but the roles can be reversed so you have the power to devour them. You get three lives to play with and if you score 10,000 points or over you are given an extra life.

Incorporated in the game are different fruits which are worth bonus points if you can eat those. Also included is a tunnel running from top to bottom of the maze where the chasers slow down and are therefore more vulnerable.

A visual warning flashes on the screen moments before the movers revert to their chasing role, and sound effects include a bleep each time you eat a dot. Written in machine code for fast action there are two speed levels for you to attempt and three skill levels.

Graphically the game gives a fair imitation of the original characters and uses Atom's high resolution graphics level four. It runs on a full 12K Atom and costs £6.75 from Hopesoft.

ANOTHER VIC IN THE WALL

THE DEMOLITION GAME

'Another Vic in the Wall' sounds rather like the title of a certain song. In fact it is a new game for the Vic-20.

It is like the arcade game Breakout where the player manoeuvres a bat at the bottom of the screen to hit a ball against the wall opposite.

As the ball hits the wall it knocks bricks slowly demolishing it one brick at a time.

The game uses a curved bat and the game gets harder each time you play.

Another Vic can be played on an unexpanded Vic-20. It is written in machine code so it can get very hectic. High resolution colour graphics and sound add to the game's playability.

If you have a joystick handy you can use it with the game. It would free you from key-pushing and could give you a better chance of winning.

Another Vic in the Wall is available from Bug-Byte at £7.

AN UP-TO-DATE CHESS CHUM

THE MATE

If you have difficulty finding a mate of similar chess standard to yourself there is now one who keeps himself up to date with computer chess advances.

The Mate is a combination between software and hardware with the powerful program written on disc but also including a board. There is no need to key-in your moves, just place the pieces as you normally would in a conventional game and the new position is picked up by the magnetic sensors on the board.

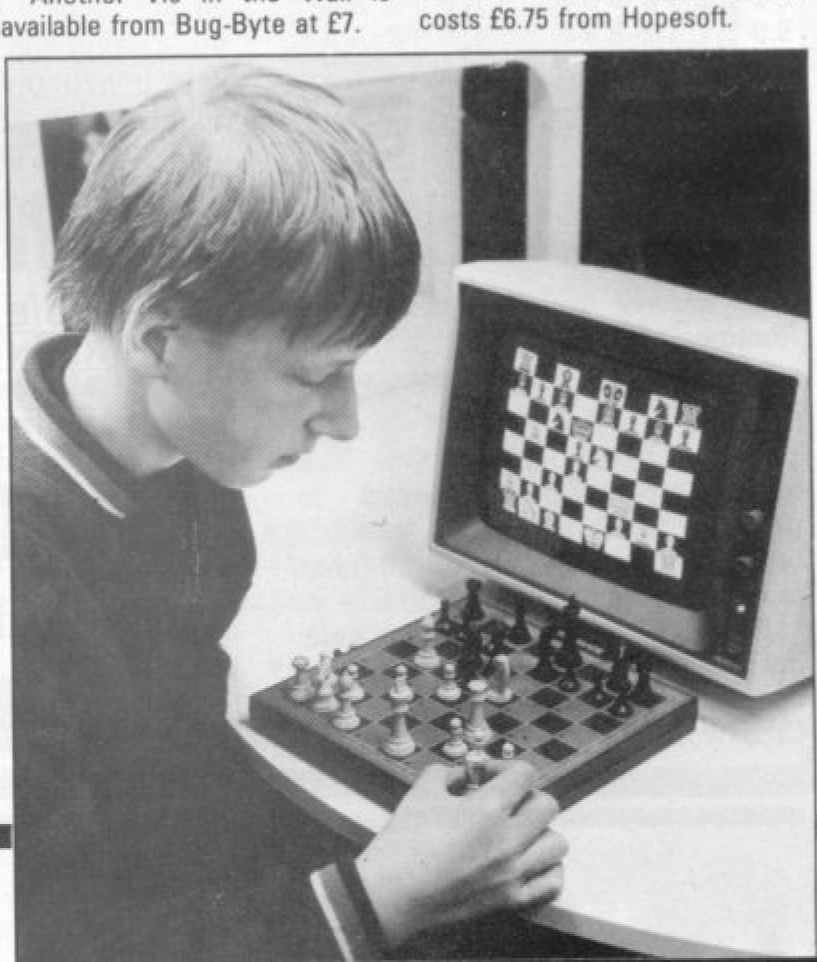
The program is written by Applied Concepts, manufacturers of the Boris and Morphy chess programs and comes on a floppy disc which can be upgraded.

When the system is hooked up a picture of the board is displayed on the screen. The Mate makes its own move which is indicated by L.E.D. lights positioned on each square.

The chess program includes the en-passent move and castling and if you link the computer up to a printer you can get a printout of every move.

At present your little Mate only runs on the Apple II computer but plans are afoot to adapt it for use on the Pet and Tandy.

Pricewise it falls into the more expensive end of the market retailing at just under £300 including VAT, from Database.



Illustrations: Jon Davis

GAMES NEWS

DEATH LURKS IN THE LABYRINTH

MAZEOGS

Warthogs are mild-mannered compared to the Mazeogs found wandering the tunnels of this labyrinth.

Your quest is to search the corridors of a complex maze for hidden treasures contained within it. But as you traverse the confines of the maze there are 30 evil-minded Mazeogs on the lookout for you.

Guiding you on your journey are prisoners who have been spared death on their quests. Instead of being killed the Mazeogs have placed them in a state of suspended animation and bricked them up in the walls of the maze.

Only when you, the explorer, investigate the maze's corridors do they come to life again. You can recognise them by their blinking eyes, and they will give you information.

Unfortunately, you have been endowed with a poor memory and can only retain this information for 10 seconds.

Killing the Mazeogs is possible with the 40 swords which are littered about the underground passageways for you to pick up and use in your defence. But beware, you can only use them once, and can only pick one up if your are unarmed.

Three game variations are available on the cassette which can be bought from Liverpool based Bug Byte for £10. It runs on a Sinclair ZX81 with a 16K RAM pack.

NEVER A CROSS WORD

SCRIBBLE

Two new computerised word games will help Scrabble lovers to develop their lexicography skills.

Scribe is like Scrabble, that old favourite board game. For one or two players you use a chequered board where you spell a word from letters which are randomly thrown up by the program.

But you can't hold on to letters you don't use during your turn.

You can place the word on the board as you do in Scrabble, so that at least one letter in the word you create interlocks with one of the words already placed on the board.

Points are scored for every letter, the value of each one depending on the degree of difficulty there is in using the letter.

Keeping score for the players is the computer, and it also places the letters.

This game runs on the Texas Instruments 99/4a and is produced by PRP Computer Graphics. It has also brought out a crossword game in which the player has to fill in the frame with six words.

Both cost £6 inclusive of postage and packing with discounts available. Copies are obtainable by mail order from Stephen Shaw, 10 Alstone Road, Stockport, Cheshire.



APPLE JOB FOR SELWYN

Reviewing games has blossomed into a full time job for *Computer and Video Games* Apple reviewer Selwyn Ward.

Now he has broadened his scope to bring out a new bi-monthly magazine *Computer Games Review*.

The first issue is due out in June.

***Computer Games Review* is published by Kent-based Computer Publications and is available by subscription only.**

FOR THE SERIOUS GOLFER

GOLF

Grab your nine iron and head for the bunkers — the game of golf is scoring a hole-in-one with micro users.

One version of golf — one of several around at the moment — runs on Atari and the Apple. You can play games simulations of courses that actually exist, with a full selection of clubs available for your use.

The game contains all necessary information for a realistic simulation. Wind, weather, and other atmospheric factors are taken into consideration.

You are in total control over almost everything you do. You can make any type of shot that you want. You can determine the amount of force you want to use when hitting the ball.

This is a good colour simulation which could subsitute for the real thing on rainy days.

Golf is available from Holdco on diskette for the Apple and Atari. It requires 48K of memory and costs £29.50.

SHUTTLE OFF ORE ELSE

ESCAPE FROM PULSAR 7

An energy giving ore turns a harmless creature into a savage man-eating beast on board your space ship.

You are the sole survivor in the Pulsar 7 cruiser which is returning from a mission delivering the ore Redennium to the people of a small planet for development purposes.

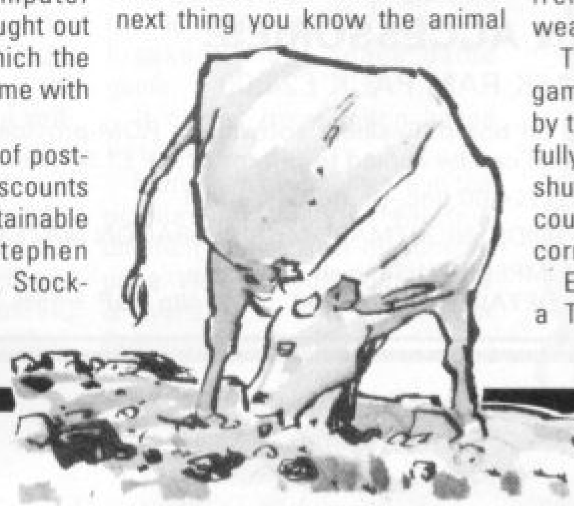
In part payment for the ore you and your crew are given a creature for your own planet's intergalactic zoo. During the return flight the creature escapes from his cage and frolicks in the remains of the Redennium ore. The next thing you know the animal has grown into a vicious beast the size of a small horse.

The cage can no longer contain it and before your men have a chance to dope him into a state of suspended animation he breaks out and one-by-one kills them all.

Now your only chance of escape is to take to the shuttle craft and head back to your own planet. But the evil beast is playing a cat and mouse game hiding in the recesses of the Pulsar 7 freighter, and bobbing and weaving to trap you.

This is a space adventure game and the way to escape is by trial and error, but tread carefully and choose your path to the shuttle craft warily. The monster could be waiting around the next corner to attack you.

Escape From Pulsar 7 runs on a TRS-80 or Video Genie and costs £10.50 including VAT and postage and packing for the tape version, and £14 for the disc version. It is available from Molimerx of Bexhill on Sea.





GAMES NEWS

CUT OFF THE FEDERATION'S SUPPLY LINES

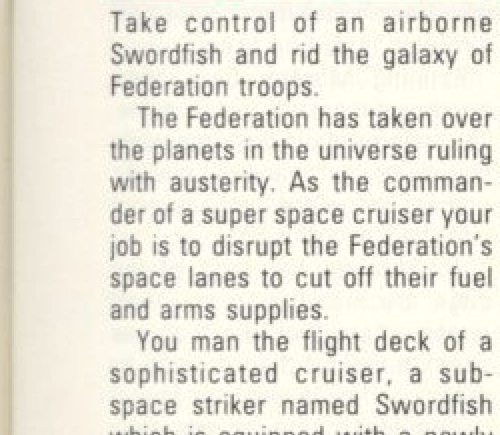
SUBSPACE STRIKER

Take control of an airborne Swordfish and rid the galaxy of Federation troops.

The Federation has taken over the planets in the universe ruling with austerity. As the commander of a super space cruiser your job is to disrupt the Federation's space lanes to cut off their fuel and arms supplies.

You man the flight deck of a sophisticated cruiser, a subspace striker named Swordfish which is equipped with a newly developed subspace drive. This facility allows you to hide in deepest hyperspace and "surface" when you want to attack the enemy using lethal Antimat torpedoes.

Detecting the enemy is made easier for you with a real space sensor probe which can indicate the location of vessels and give you a readout of their speed and range.



The Federation has a fleet of sweepers, carriers and cruisers which are on red alert to attack your ship when it surfaces. Their cruisers are equipped with subspace mines and are on the verge of mastering the technology of subspace drive.

This game is the first product from a new firm Pixel Productions set up to write software for the VIC-20 and the Sinclair ZX81. Based in Southwest London, the firm plans to bring out more software for both machines on a regular basis.

Subspace Striker runs on both the VIC and the ZX81 with 16K expansion RAM pack. It's obtainable by mail order for £9.50. (VIC version) and £5.50 (ZX81 version).



THE MEANEST MARAUDERS

SPACE MAZE

Locked deep in a space maze lurk the Frogso aliens. A meaner band of marauders you wouldn't hope to meet.

You are dropped on a planet in the middle of a maze which is infested with Frogsoes. As you tread the paths of the maze in an effort to escape, the Frogsoes are alert to your movement and scurry through the corridors.

Once they move in on your position it means certain death for you. Without a moment's hesitation they will destroy you.

Space Maze is a full colour game and throws up a different maze when you begin a new game. Each one is drawn in 3D to heighten the interest and the maze contains additional doors which you can choose to go through if you feel brave enough. But beware you don't know what awaits you the other side.

Program Power is the brains behind this new game which numbers amongst the first to be released for the BBC Microcomputer. It's out now from the Leeds based firm for £5.95 a copy. It's only compatible with the model B machine.

A GALAXY OF GAMES

FUN & STRATEGY

A galaxy of games for the BBC Microcomputer have recently found their way onto the market.

The BBC itself is producing two games cassettes which have been written for the company by Acornsoft. The cassettes are titled simply Fun Games and Strategy Games. There are four on each cassette and they are all tried and trusted favourites, professionally turned out.

On the Fun pack you get a version of the bat-and-ball game, Breakout; Dodgems, the car collision game; Simon, the musical memory game and the very compulsive Snake, which has the player controlling a gradually growing snake as it romps around the screen gobbling up letters.

The second tape brings to life, a Startrek game called Galaxy; the Japanese five counters-in-a-row game of Gomoku; the colour-code game of Mastermind and a hard-to-beat Reversi program which will test all but the very best players.

The cassettes make good use of the computer's marvellous graphics and retail at £10.

TIME TO PLAY APLENTY

VIC 6

Hours of playing time is packed onto one cassette in the shape of six addictive games.

The VIC 6 Pack will keep you entertained with games like three reel fruit machine, the word guessing game hangman, a missile attack game, a version of breakout and a space battle game.

It comes from Bolton based Beelines.

More than six packs are in the pipeline for the VIC featuring different games at a reasonable price. Vic 6 will cost you £10 and is available by mail order from Bolton-based Beelines.

DODGE THE DEADLY RAIN

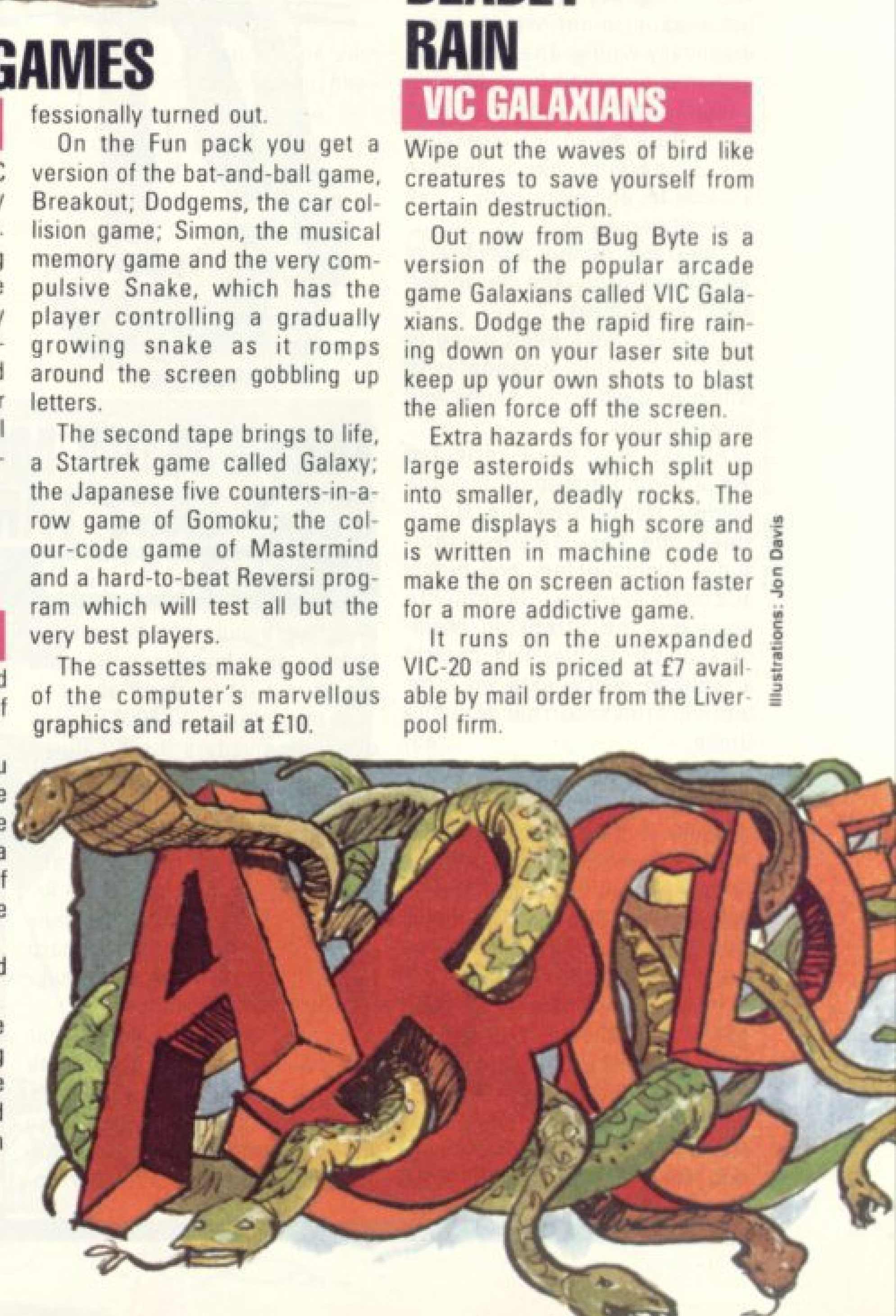
VIC GALAXIANS

Wipe out the waves of bird like creatures to save yourself from certain destruction.

Out now from Bug Byte is a version of the popular arcade game Galaxians called VIC Galaxians. Dodge the rapid fire raining down on your laser site but keep up your own shots to blast the alien force off the screen.

Extra hazards for your ship are large asteroids which split up into smaller, deadly rocks. The game displays a high score and is written in machine code to make the on screen action faster for a more addictive game.

It runs on the unexpanded VIC-20 and is priced at £7 available by mail order from the Liverpool firm.



Illustrations: Jon Davis



MONKEY BUSINESS

MONKEYSHINES

You can keep swinging in Jungle Book style in Monkeyshines.

In this game purely for children there are five different versions to learn and practice the art of hand-eye co-ordination.

The first is Monkeyshines. For one or two players the object is to steer clear of a cage of four enraged yellow monkeys.

When the game begins the four creatures swing from the top of the cage and gradually leap from bar to bar around the cage. You must avoid the monkeys by jumping onto various bars yourself.

If you can't beat them join them, and leap on top of one.



When you press the action button the angered monkey turns a vivid, livid red. Now he's at his most dangerous.

All you can do to survive is to keep away from the red monkey by keeping an eye on his whereabouts. Use the joystick controls to move your man about the cage by pressing the action button simultaneously with the joystick.

The computer's brain keeps track of the score and adds a point to the score board.

If you get caught out by the agile red monkeys you will find they strike to kill and your man will stand frozen to the spot with arms akimbo.

The controls are quite difficult to master but once you have got the better of them the game loses its appeal. Children however will find their interest is sustained because of the degree of difficulty.

Monkey Chess is the second game on the cartridge and features an extra player — on your side. He has special abilities and can remove and add bars wherever and whenever he pleases, if you can get him there in time to thwart the offending monkey. This clever player can also help his team mates out by building ladders for them to climb to bars which would otherwise be out of their reach.

Throughout the game this useful addition can alter the pattern of bars making whatever strategic layout he likes.

Rotating Monkey Bars adds another dimension to the game. The bars rotate in the cage while you make your man leap quickly, and agilely before the bars move into their new position.

In Shuteye the bars of the cage are invisible so you must guess where they are. You can sneak a look at their position by pressing the 'V' sensory key.

The last game on the tape lives up to its name and will drive you bananas. It comprises a mixture of three of the previously mentioned games, the choice of which is up to you. Having played it you won't want to unzip another banana in your life.

Monkeyshines runs on the G7000 Philips Videopac Computer and is the 37th pack in the range. It costs around the £23 mark.



THE MUTANT SWARM ATTACKS!

YAR'S REVENGE

A band of mutant house flies were the result of a mad scientist's experiment which went drastically wrong. The Yars are a powerful race and have been in conflict with an enemy called the Qotile for a millenium. Now they are embarking on a savage assault to do away with these evil beings.

The Qotile control a section of the galaxy protected by an impenetrable shield.

The Yars have been trying to build a suitable weapon with which to destroy the shield and their enemies.

At last they have perfected the Zorlon Cannon. Once the soldier penetrates the Qotile shield the Yars can use their super sophisticated, and highly accurate Zorlon Cannon to wipe out the attacking members of the Qotile. You control a weapon which eats the protective bricks surrounding the Qotile.

In the face of the Yars onslaught the Qotile fight back in defence of their space territory.

Yar's Revenge was developed in the states by Atari and is hailed by the firm to be a "totally new game concept developed by Atari engineers".

Yars revenge runs on an Atari VCS and is scheduled for release in July. There are eight different versions of the game on this cartridge catering for one or two players and various degrees of skill. The retail price is £29.95.

THESE SLOW MOVING ALIENS MAKE EASY TARGETS

INTERTON INVADERS

If you were under attack from the Interton alien invaders you would not have a lot to worry about.

In this Interton VC4000 version of space invaders the creatures move so slowly that the game loses much of the addictive quality of the original.

The rows of invaders are spaced wide apart and their firing rate is fairly slow. Sometimes the shots come in short, sharp bursts from the same alien making them easy to dodge.

Instead of three shields your firing base can hide behind the Interton game has eight.

Graphically the invaders are quite creative. A spaceship worth bonus points appears randomly across the top of the screen as in the original game. But it doesn't move at the speed of light and is fairly easy to shoot.

Praise must go to the effort put into the packaging of the Interton games. Each one is beautifully presented in glossy professionally produced boxes. The cartridge costs £19.95.



THE GAME OF THE FILM OF THE GAME

TRON, FROG BOG AND STAR RAIDERS



Video games are soon to make their debut on the silver screen.

This winter the electronic character Tron will burst to life amongst brilliant flashes of optical and light effects and computer graphics. The film Tron, named after the star of the picture, revolves around two worlds. Firstly the real world in which a mammoth computer system in a communications giant under the control of one program.

And secondly the electronic world is the world belonging to Tron. He and his electric and light beings have outgrown their real-world masters and are intent on overthrowing the program which rules their lives.

Tron is a totally fantastic story in a futuristic world and is the first time video games have been the theme of a major film. Capitalising on the idea is Mattel and a Tron cartridge for the Intellivision home games centre is due out later this year.

In America two Tron packs are planned. Tron 1 in which you take the part of the video star using deadly discs to engage the enemy, the evil blue warrior. In Tron II the story of the film is continued and your job is to penetrate the master control program's innner circle to gain control of it. Perils about include alien creatures which you must destroy to reach your target.

In the UK version the two are combined. It is due out in September but the release date is subject to change. We will keep you posted on the latest information about the game and will review it when released.

A game with an unlikely sounding name Frog Bog is due out before the more inspiring Tron. Not quite in the same graphically exciting vein, Frog Bog is aimed more at young children.

Players operate two frogs sitting croaking the day away on a couple of lily pads. Buzzing above their heads are dragon flies which are your passport to points. When you think you can move your frog into a suitable fly-catching position use the handset to make him leap.

You do not have to stay on one lily pad. Your frog can leap around from pad to pad to try his luck out elsewhere, but make sure of your leap or you could end up in the water.

A couple of years after the release of the much acclaimed Atari computer game Star Raiders a version for the VCS is on schedule for launch later this year.

The game is a space simulation game (a kind of super Star Trek) in which you control a spaceship on a mission to locate and wipe out alien spaceships. They patrol quadrants of the galaxy where you seek them out. In the computerised version there is a hyper drive option, an easy-escape warp facility, as well as the use of a refuelling station. Whether or not the VCS Star Raiders will match the Atari 400/800 game remains to be seen. So far no release date has been set.

STOP THE ALIEN SLAVE TRADE

DEFENDER

The humanoid slave trade is enjoying a boom year in the Galaxy but you have been detailed to prevent alien races making off with too many of your planet's populace.

Atari has made a point of buying up the licences to copy successful arcade games and it will surely pay-off with the popular Defender game.

When the alien race detects a human on the planet's surface, it sends in its Landers to carry them off. These are equipped with specially sensitive grabbing mechanisms which can lift the poor unfortunates off the surface

You can defend the poorly equipped humans by racing your spacecraft over the country blasting aliens with your high-powered laser cannons. It is a question of racing as Landers can come down off screen and pick up humans while you are occupied elsewhere.

If a Lander has a human in its delicate grip, it holds the hostage beneath itself as it heads for the top of the screen.

This leaves it open for you to fire at the Lander and make it drop its prize. If it's not too far from the ground the human will land safely, otherwise you may have to rush to his aid and help him survive the drop.

The alien force is a strong one — including Pods which house the hordes of swarmers. When you score a hit on a Pod, it will release a multitude of small swarmers which live up to their name and chase after you.
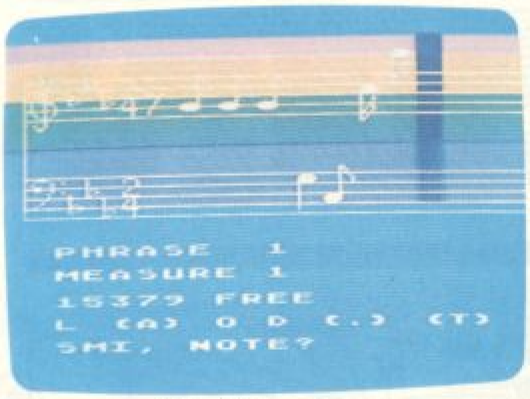
Bombers too wander across the landscape close to the surface leaving their deadly trail of death. And when the Landers reach the top of the screen with a humanoid in their grasp, they are transformed into the far-more dangerous mutant craft.

There are 20 different versions of Defender on this Atari VCS cartridge. It features some creative graphics and appropriate sound effects.

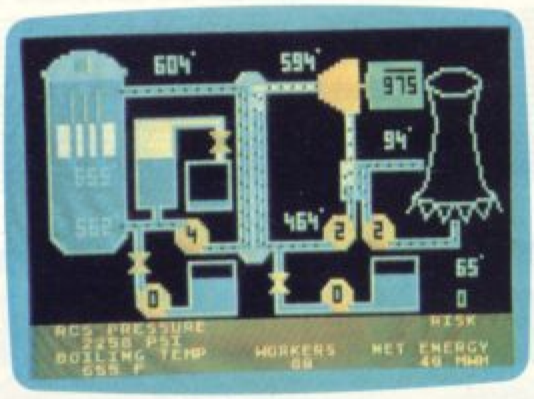
It will be available from mid-July and will sell for around £29.95.



Illustrations: Terry Rogers



Music Composer



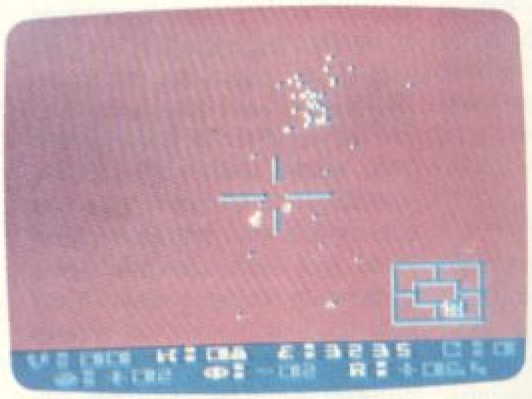
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Graph-it



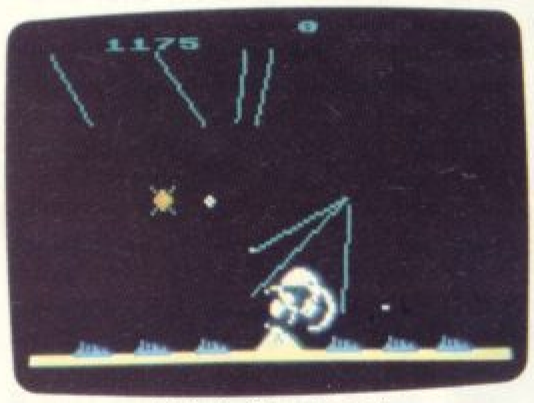
Intro to BASIC 1



Star Raiders



European Countries



Missile Command



Basketball

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CHESS

The first question prompted by computerised chess has still to be answered. How soon they will reach world championship standards, is still a popular topic.

In fact such statements have been made almost constantly over the last 30 years, but it is only fairly recently that strong players have begun to take them seriously. This month I present two games played by computers against world (Human) champions, both of which show the human emerging victorious.

The first game was played by Bobby Fischer, an American who is — or was — arguably the strongest player in the history of the game. Since winning the world championship against Boris Spassky at Reykyavik almost 10 years ago in a match which made headlines world wide, Fischer has virtually abandoned chess altogether.

Even including "friendly" and casual games, Fischer's total collection of games since the match against Spassky could probably be counted on the fingers of one hand. Of this collection one was a joke game played for the Bob Hope television show in America where some of the moves were illegal! The only one of the games which seems to have been published was the following one, which was played in 1977.

The opponent was a version of Machack, a program written by Richard Greenblatt at M.I.T. which competed with some success in tournaments in the late 1960s. Its playing strength has been estimated as around 2000 on the Elo scale (about 180 on the British Chess Federation scale).

White: Bobby Fischer, Black: Greenblatt Chess Program

1. P-K4, P-K4; 2. P-KB4, PxP; 3. B-B4, P-Q4;

The Kings Gambit is an opening long out of fashion at master level, but one which Fischer has occasionally played.

3. B-B4 A favourite line.

4. BxP, N-KB3; 5. N-QB3, B-QN5; 6. N-B3, 0-0; 7. 0-0, NxB; 8. NxN, B-Q3; 0.P-Q4

White has clearly emerged well from the opening, and now threatens to regain his gambitted Pawn with a strong King's — side attack.

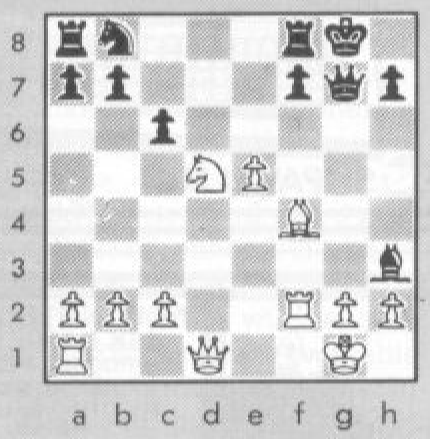
9. . . . P-KN4; 10. NxNP!

A sacrifice which demolished Black's position.

10. . . . QxN; 11. P-K5

If now, say 11. . . . B-K2, White captures on KB4 with an overwhelming position. So Black tries to gain counterplay by returning the piece.

11. . . . B-KR6; 12. R-B2, BxKP; 13. PxB, P-QB3; 14. BxP, Q-N2;



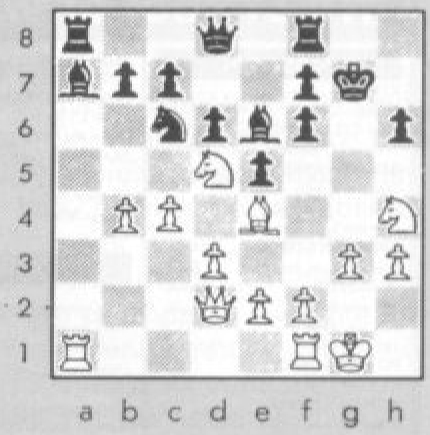
15. N1B6 ch, K-R1; 16. Q-R5

White now threatens both QxB and B-R6 and it is impossible to prevent both threats at once. However, the computer plays on — as computers usually do.

16. . . . R-Q1; 17. QxB, N-R3; 18. R-B3, Q-N3; 19. R-QB1, K-N2; 20. R-KN3, R-R1; 21. Q-R6 mate. A very pleasing finish.

Fischer's successor as world champion was Anatoly Karpov of the Soviet Union. Unlike Fischer, Karpov has played in innumerable tournaments since acquiring the title in 1975, with an outstanding record of success. After one of these tournaments in West Germany a couple of years ago, Karpov was persuaded to take on 25 versions of the so-called "Chess Champion Super System III" in a simultaneous display Karpov won this contest 25-0 but had one "near miss".

The above position was reached after Black's 19th move with Karpov playing White. Karpov's position is overwhelming.



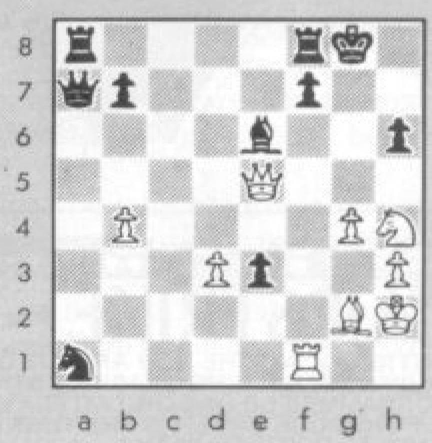
20. P-N4, N-Q5;

Black's move contains an insignificant threat, which Karpov — probably bemused by the computer's previous uninspired play — completely overlooked.

21. K-R2? N-N6; 22. Q-N2, NxR;

White has not only lost his Rook but cannot even recapture the Knight. If 23. QxN then BxBP, whilst if 23. RxN, B-Q5 leads to fatal exchanges.

23. P-K3, P-B3; 24. N-QB3, P-Q4; 25. PxP, PxP; 26. B-N2, P-Q5; 27. N-N5, Q-N3; 28. NxB, QxN; 29. P-34, PxKP; 30. PxP, PxP; 31. QxPch, K-N1;



Karpov is still a Rook behind and now tries a swindle.

32. N-N6

If now 32. . . . PxN; 33. QxBch gives at least a draw by perpetual check. However, 32. . . . Q-N1 pins the Black Queen avoiding mate. If then White plays 33. N-K7ch, K-R2; 34. B-K4ch then P-B4 wins, since the Queen is still pinned. However, the computer selects the worst possible move.

32. . . . KR-Q1??; 33. Q-R8 mate.

A narrow escape for Karpov but the computers' play for the first 20 moves did not merit a win.

By Max Bramer

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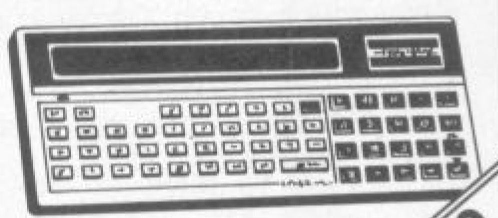
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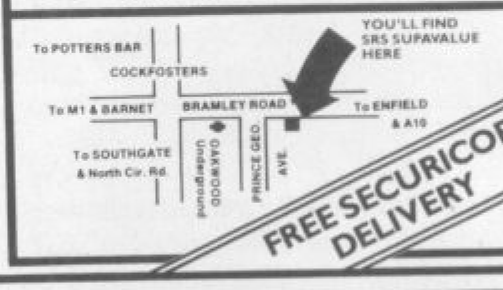
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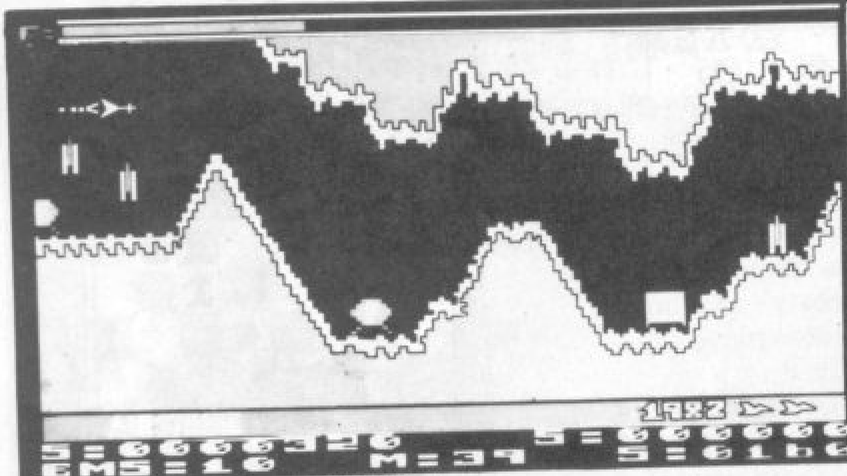
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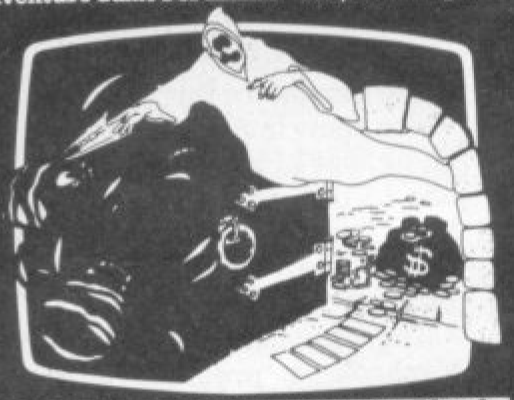
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A complete game encompasses 30 rooms and 20 prizes, and prize capture is not always an easy task; a different technique or twist is involved in obtaining each one. Some require physical dexterity to reach while others can be acquired only through an intellectual problem solving path. Even some rooms are initially hidden from the player and must first be found before their prizes can be captured. Action Quest provides challenges both for fast action players as well as for those motivated by intrigue.

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PRESTEL



By Peter Linton

Telesoftware is a topic you are going to hear a lot more about this year. It is an exciting new way of loading programs and data into micros, because it is all electronic. The secret is to use videotex — that is, teletext or Prestel — as the storage medium.

All you have to do is tune in to teletext, or dial in to Prestel, using your micro, plus a special adaptor. You select what you want — for instance a particular program — and download it into your micro. Then you disconnect, and RUN the program. Telesoftware will give you access to a far bigger library of software and data, and avoid the hassle of drawerfuls of assorted cassettes or discs.

How does it work? At the technical level, it is pretty complex. But the principles are straightforward. Let's look at it first from the teletext/Prestel end. A reminder for those not familiar with those terms — teletext is broadcast via T.V. transmitters to your — modified — T.V. set — e.g. Ceefax and Oracle.

Prestel is British Telecom's viewdata service, which offers over 200,000 pages of information via the telephone line.

Now, each teletext/Prestel page is stored as a string of alphanumeric characters, together with some additional control characters for colour, etc.

The characters are, by and large, standard ASCII ones. Suppose a page held not, say, a weather forecast, but a games program written in BASIC. If you could somehow feed that string of characters into your micro, you would then be able to use that program. That, in a nutshell, is the idea behind telesoftware.

The actual implementation of this idea is a bit more tricky. For a start, each Prestel character is made up of seven binary digits, plus a start and stop bit, and a parity check bit. Those extra bits have to be stripped off, and the remaining bits coverted into something your micro understands.

This is normally done by software or firmware — ideally just a ROM fitted into your micro. Then there's the question of feeding the Prestel characters in, which means an interface of some sort. The commonest one is what's called RS232C. This is a standard computer industry interface to allow various peripherals, such as printers, etc, to be hooked up to a micro.

These days more and more micros have RS232C either built in, or as an optional extra. For instance the Sinclair Spectrum will have an optional RS232C interface available this autumn for around £20. If your micro does not have a standard interface, then one has to be designed. That's why Prestel ran a competition earlier this year to find an interface for the Sinclair ZX81. A few interesting prototypes emerged, and production models should be available in due course.

So what do you actually need to make telesoftware happen on your micro? For teletext, you will need a special adaptor. For viewdata, if your micro already has RS232C (or equivalent) all you need is the software and a modem.

The modem is there to convert the digital signals from your micro into the analogue signals needed on the telephone lines. The adaptor must also have a special connector for Prestel, or an acoustic coupler that fits on to your telephone. One acoustic coupler — the PAC-M1 made by OEL has a modem built in, and makes possible a very simple, easy connection.

Before we look at what you can do with telesoftware, let's allay your worries about cost.

Adaptors are coming down to the £200 area, and heading for £100. The target is £50. As for running costs, programs on teletext are free, once you have a teletext T.V. and adaptor. On Prestel, you pay the normal phone charges for using the phone line, plus computer access time. At peak times, this is not cheap — but in the evening it's much more reasonable — about 5p for an eight minute phone call, plus 4p for four minutes computer connect time. You may also be charged for looking at certain pages.

The prices are set by the page owners, who can charge anything from 0.1p to 50p.

Suppose you dial in and find a program you want to try. Let's assume it is 10K, occupying say 12 pages with a charge of 2p a page.

It would take something over two minutes to load. Let's assume you spend another five minutes looking at other Prestel pages.

Total cost — in the evening and weekends — 5p + 8p + 24p = 37p for a 12K program. Not bad, compared to the price of software generally.

So what's in it for you? Above all, a simple easy way of getting software. Already there are dozens of pages of telesoftware on teletext and Prestel, with more being added.

It won't be long before computer magazines offer programs both in print — and in telesoftware form. Once you have an interface, you will of course have access to the whole of Prestel, with its large databank of information and Mailbox service, as well as other viewdata systems.

It also offers another intriguing possibility — you can download, and store, ordinary viewdata pages.

Suppose you designed a Stock Market game with share prices. Then instead of inventing prices, you could dial in to the Stock Exchange's Prestel pages, and transfer real share prices into your game. That would add a nice touch of reality. Then the next day you could check if you really had made a killing, by comparing the results of your game with what actually happened.

ARCADE



A FUNNY THING HAPPENED ON THE WAY TO THE POND

TIPS ON FROGGER

Naturalists are worried that Britain's frog is fast becoming an endangered species.

Players of the popular arcade game of Frogger will understand why . . . It's because of all the trucks, snakes, sinking turtles and alligators! These are just some of the dangers which confront a frog on his way to the breeding holes.

Frogger is a game of calculated risk and calm nerves which rewards experience more than most arcade games.

The Frogger screen can be broken into two areas, the road and the river, divided and surrounded by banks.

From the bottom of the screen, the frog must first negotiate the road with five lanes of traffic, then the river by jumping on logs and turtle backs.

Five frog holes are on the opposite bank and all must be filled to earn a new screen with increased dangers.

The first screen has slow moving traffic and the only danger is that the beginner will misjudge the distance or the speed of his own frog's leap and accidently brush against a fender or jump into the back of a passing car — always leave plenty of space before jumping after a car.

The left-hand frog hole is the most difficult to fill as the river current moves from left to right.

The other aquatic hazard is diving turtles. These appear to be the same as normal turtles but periodically turn green and sink below the surface. Only one in four turtles is prone to this disturbing behaviour. Before you leap check the line to see where the last green turtles in that line were. Sinking turtles are never together in a line.

Small purple frogs can be picked up from logs and carried to safety for bonus scores. If these are missed at first, remember you can always go back and pick them up again — but keep an eye on that time.

On the second screen, alligators appear and the traffic speeds up. Don't be intimidated by the increased traffic flow, get out and use sideways jumps in the flow of traffic to reach the middle. The fourth lane of speeding racing cars is the main danger, so try to join the third lane at a place where there is a corresponding gap in the fifth and break for it just after the speeding cars fly past.

The alligators do not have to be avoided at all costs — just avoid their jaws. They are mainly a danger when you want to fill the left-hand frog hole and are waiting for a log to appear. It is possible to get into a froghole with a 'gator waiting there as long as it is not about to leap fully out. The third screen's snakes can also be trodden on as long as you avoid their gaping jaws.

When logs are scarce make use of fast moving turtles to go back and find an emerging log.

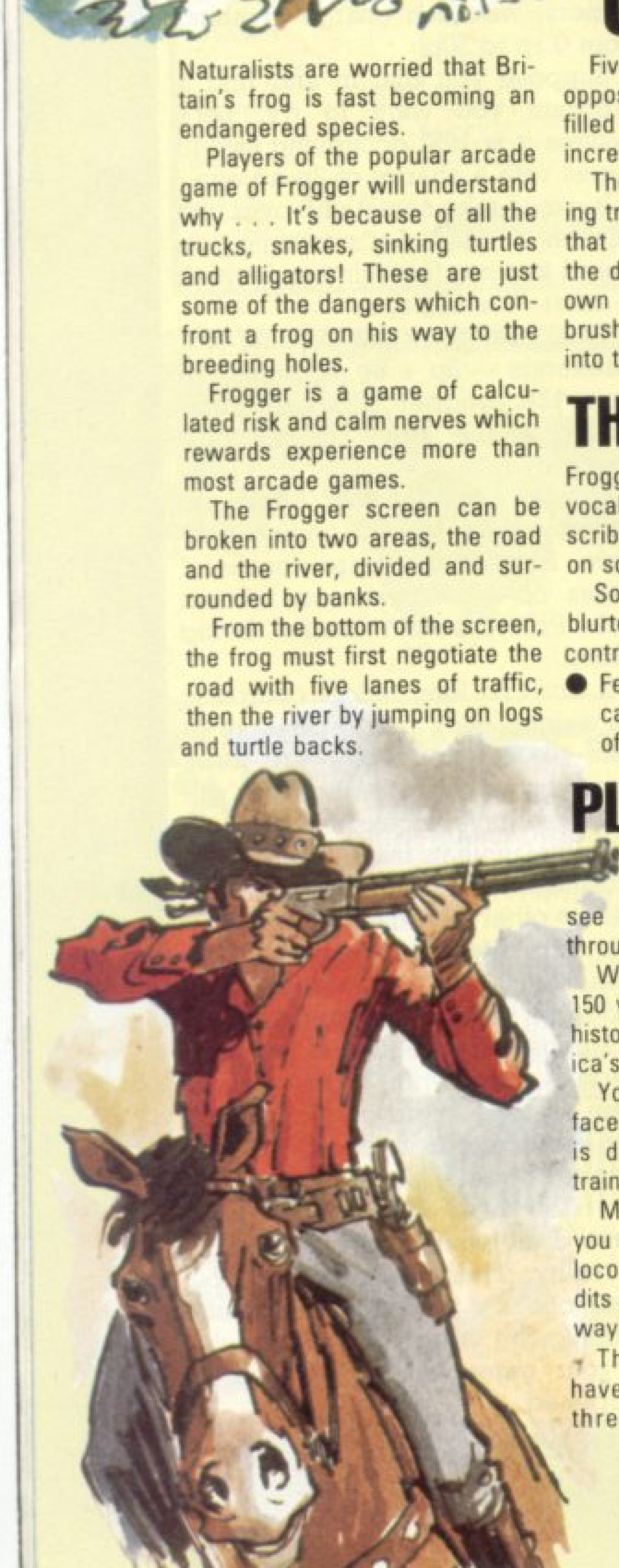
Be positive in your joystick movements as many lives are lost by careless or accidental nudges. And may you spawn many tadpoles.

THE CROAK ON THE STREET

Frogger players have a full vocabulary of phrases to describe the way they met their end on screen.

Some of those we've heard blurted out by disgusted frog controllers are:

- Fender sandwich — being caught between two streams of traffic.
- Turned turtle — stepping on a sinking turtle.
- Bite of bank — misjudging a frog hole and expiring on the bank.
- Wide-eyed and logless — one of my favourites, overheard when a friend sailed off the screen while still waiting for a log to appear.



PLUMB LOCO IN THE WEST

WILD WESTERN

There's danger in them thar hills. It's up to you to see that the locomotive wins through.

Wild Western takes you back 150 years to relive the colourful history of the opening of America's western states.

You take the role of a sherriff, faced with an outlaw gang which is determined to hold up the train.

Mounted on your brave steed you race alongside the chuffing loco dodging the returning bandits fire by means of an eight-way joystick.

The game ends when you have lost all three sheriffs or three bandits have jumped aboard the train.

If a bandit hops onto the train, you must also climb on board in order to shoot him. This requires skill and timing to run parallel with the train at a safe distance and push the jump button.

Riding on board the train can also be hazardous as waterpipes from the trackside tanks can dislodge you.

For shooting practice you can hit coins tossed in the air by your horse. You double your bonus if you hit it and get a horselaugh if you miss. Additional sheriffs are obtained after 30,000 points.

ACTION

THE SCENIC ROUTE

TURBO

Realism is the name of the arcade racing game. Turbo bears more resemblance to the real thing than it does to the arcade industry's first primitive attempts to provide Grand Prix thrills.

It features a small diameter racing steering wheel, a two-speed gear stick and an accelerator pedal.

But the main improvement is the marvellous graphics capabilities which puts a whole variety of backgrounds and racing conditions on the screen.

The scene is a cross country race to test your road-handling skills. The Turbo course winds through busy city centres, across narrow suspension bridges through dark tunnels and open stretches of country.

The driver's capabilities are further put to the test by some sudden changes to the road conditions. These range from surprise snow flurries to wreckless competitors — and even include an emergency routed ambulance.

The points score can be the fastest moving thing on the screen as the driver weaves from side to side and changes quickly down to avoid an otherwise inevitable crash.

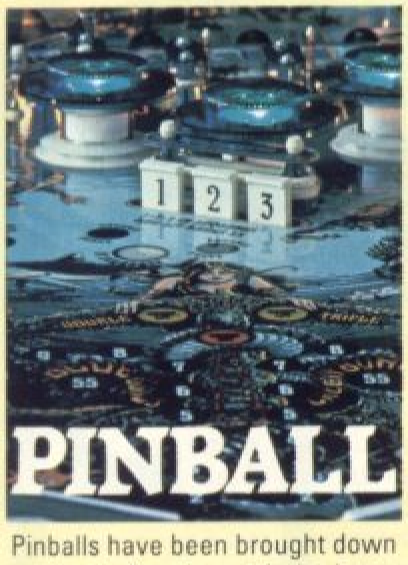
Drivers can monitor their progress and race position by a quick glance up at the readouts at the top of the screen, which tell how many cars have been passed and the time remaining.

Any first lap collisions send the driver back to the start — after that collisions result in a screen-filling crash.

Extended play bonuses are awarded to drivers who have passed sufficient cars with time to spare.

Some particularly dangerous parts of the course are: the rolling rural hills, where road dips can obscure the cars ahead; the dimly-lit tunnels where cars appear suddenly out of the blackness; the ocean front palisade where tight corners around a high wall also restrict the views ahead.





Pinballs have been brought down to size in America with the introduction of the new Micropin. This is a table-top pintable, electronically sophisticated but introducing the word "portability" to the arcades.

The legless stainless steel machine keeps its high score on an L.E.D. display and if no-one tops a high score after 200 games it will automatically switch to display the best high score during that period.

The machine will fit on most tables and includes most of the features common to pinball tables. It will give out sounds whose noise level adjusts itself to the surroundings.

It has a two-level tilt mechanism which will result in the loss of the ball in play.

A battery back-up system will retain scoring even if the game is unplugged.

The Micropin is expected to feature in lost corners where it would be impossible to place a full'size "pin" and if successful in the U.S will undoubtedly be crossing the Atlantic soon.

ZONING IN ON A TOP SCORE

RECORD BREAKERS

There are certainly a lot of record breakers at work in Britain's arcades.

In response to our May issue rundown of top scorers on the more popular games, we have heard from a lot of budding arcade champs.

Perhaps the most astonishing score came from Matthew Parnum who is claiming a score of over five million on Battle Zone. A quick bit of work with a calculator gives us an estimate of six hours spent at the machine to achieve this score. Although we have had several entries on Battle Zone no-one else topped 319,000 which was notched up by Mark MacLean. Matthew says that he managed his high score after reading our tips on how to play it in the April issue.

Below we present our top 10, to give you something to aim at.

If you can beat any of the scores in our chart or have another game you are scoring highly on, please drop us a line and tell us where you achieved your top score and how long it took you. New games we are currently awaiting top scores on are: Qix, Crash Roller or how about Galaga?

GALAXIANS
431,820
Stewart Mathers

SCRAMBLE
813,920
Richard Cooper

GORF
228,570
John Lee

SPACE FIRE BIRD
198,620
Martin Lund

BATTLEZONE
5,507,000
Matthew Parnum

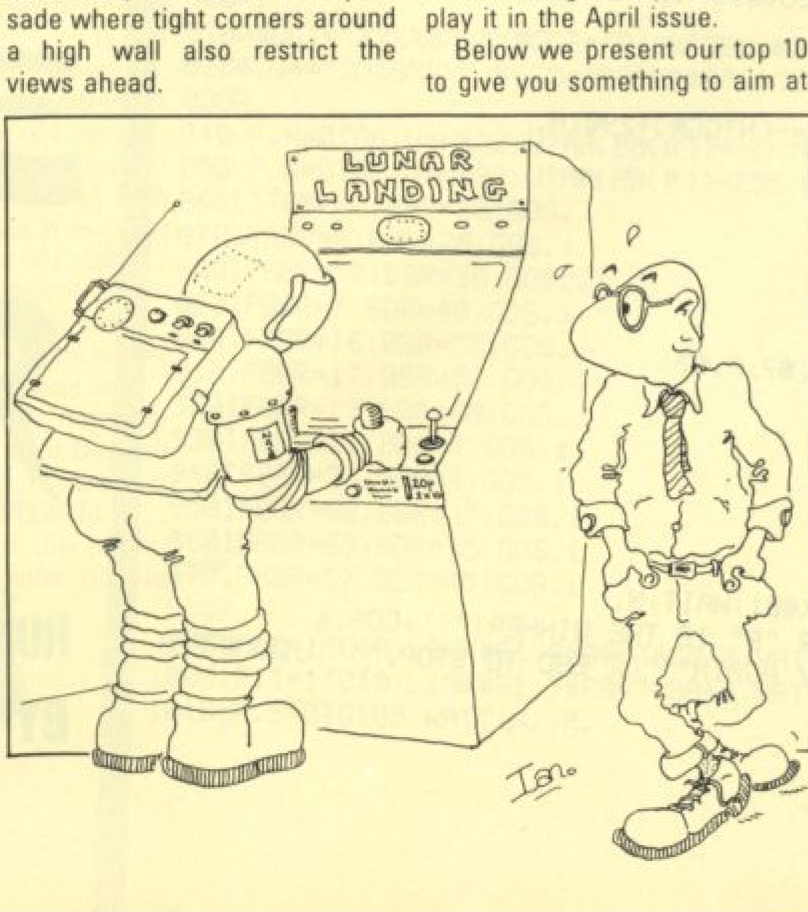
MOON CRESTA
126,950
Andrew Davies

PACMAN
281,260
Stephen Mainwaring

FROGGER
87,050
Danny Blackmoor

MISSILE COMMAND
7,556,000
Richard Holt

DONKEY KONG
369,000
Richard Hill





Snakes always come before a fall — but you can rise to the occasion should you find a handy ladder propped up within reach in this version of the old board game favourite.

The program draws a board to play on, rolls the dice, and moves the player to his new position, for between 1 and 6 players.

Line 10 prints the rules, and sets the number of players.

Lines 20 to 50 set up arrays for the board (subroutine x) and "poking" the players on the screen (subroutine w).

Lines 60 to 80 use machine language to create sound effects for climbing ladders or sliding down snakes (used in subroutines i and j).

Line 90 turns the screen white (N.b £ represents the Atom's "hash" character).

Lines 100 to 130 create the squares.

Line 140 uses subroutine z to plot the ladders (subroutines b and c) and snakes (subroutines d and e).

Lines 160 to 300 run the game, until a player wins by reaching the last square on the board.

Line 310 makes a suitable "winning" noise, whilst line 320 prints out the winner's number.

The spaces in lines 470, 480 and 500 of the program are for clarity only and should be omitted to fit the instructions into one line of program.

IF LINK£FFE3 is omitted from line 440 the game will run on its own until one of the players wins.

RUNS ON AN ATOM IN 16K

BY A. WORRAL

```
1 REM BY A.WORRAL.
10CLEAR0;P."   SNAKES & LADDERS"'';GOS.y
20DIMAA70,GG6;P=#81;?#80=160
30F.N=1TO6;DIMB(8);GG(N)=B;N.
40GOS.x;GOS.w
50F.Q=40TO120 S.10;MOVE(95+(Q/5)),Q;GOS.c;N.
60P.$21
70[;LDA#B002;LDY@#FF;LDX#80;DEX;BNEP-1
80EOR@4;STA#B002;DEY;BNEP-11;RTS;];P.$6
90CLEAR4;F.N=#8000TO#9800 S.4;!N=-1;N.
100MOVE10,0
110F.N=0TO12;PLOT2,0,167;PLOT0,24,0;PLOT2,0,-167;PLOT0,24,0;N.
120MOVE10,0
130F.N=0TO10;PLOT2,238,0;PLOT0,0,24;PLOT2,-238,0;PLOT0,0,24;N.
140MOVE10,50;GOS.z
150F.N=1 TO M;BBN=0;N.
160F.R=1TOM;GOS.v
170F.N=0TO6;U=N*32;U?#8010=-(N?GGR)+290;N.
180GOS.a;GOS.s;GOS.u
190IF(BB(R)+O)>70 G.260
200BBR=BBR+O
210GOS.t
220F.J=1TOM
230IFJ=R G.250
240IFBBR=BBJ BBJ=0;P.$7;P.$7;P.$7
250N.
260GOS.v
270IFBBR=70;GOS.s;G.310
280IFO=6 G.170
290N.
300GOS.z;G.160
310F.I=0TO25;?#80=R.;LINK#81;WAIT;N.
320CLEAR0;@=0;P.''"PLAYER "R" IS THE WINNER!"'';GOS.s
322P."PRESS SPACE TO PLAY AGAIN"'"OR ESC TO STOP."'';LINK#FFE3
325RUN
326E.
```

SNAKES & LADDERS

```
330zF.Q=5TO60 S.10;MOVE(46+(Q/5)),Q;GOS.b;N.
340F.Q=40TO120 S.10;MOVE(105+(Q/5)),Q;GOS.b;N.
350F.Q=10TO100 S.10;MOVE(160+(Q/5)),Q;GOS.b;N.
360F.Q=40TO120 S.10;MOVE(105-(Q/5)),Q;GOS.c;N.
370F.Q=70TO144 S.10;MOVE(230-(Q/5)),Q;GOS.c;N.
380F.Q=10TO50 S.10;MOVE(250-(Q/5)),Q;GOS.c;N.
390F.Q=10TO50 S.10;MOVE(150-(Q/5)),Q;GOS.c;N.
400Q=35;MOVE100,15;GOS.d
410Q=30;MOVE99,90;GOS.e;Q=20;MOVE90,10;GOS.e
420Q=15;MOVE120,100;GOS.e;Q=33;MOVE150,87;GOS.d
430R.
440aLINK#FFE3;F.I=0TOA.R.%5+1;F.N=0TO20
450O=N*32;O?#8000=255;O?#8001=255;N.
460O=A.R.%6+1
470IFO=1ORO=3ORO=5;?#8140=254;?#8141=127;?#8160=254;?#8161=127
480IFO=2ORO=3ORO=5;?#8020=159;?#8261=249;?#8040=159;?#8241=249
490IFO=4;?#8020=159;?#8261=249;?#8040=159;?#8241=249
500IFO=4ORO=5ORO=6;?#8021=249;?#8041=249;?#8260=159;?#8240=159
510IFO<>6 G.540
520?#8020=159;?#8261=249;?#8040=159;?#8241=249
530?#8140=159;?#8141=249;?#8160=159;?#8161=249
540N.
550R.
560bPLOT3,2,10;PLOT3,8,0;PLOT3,-1,-5;PLOT3,-8,0;PLOT0,8,0
570PLOT3,-1,-5
580R.
590yIN.'"HOW MANY PLAYERS(1-6) "M;IFM>6 OR M<1 G.y
600DIMBB(M)
610P.'"IF YOU LAND ON AN OPPONENT"'"HE WILL BE SENT BACK TO"
620P." THE"'"START."''"YOU GET ANOTHER 'THROW' IF YOU"'"GET "
630P."A SIX."''"PRESS THE 'SPACE-BAR' TO THROW"'"THE DICE."
640P.''"PRESS 'RETURN' TO START";LINK#FFE3;R.
650cPLOT3,-2,10;PLOT3,-8,0;PLOT3,1,-5;PLOT3,8,0;PLOT0,-8,0
660PLOT3,1,-5
670R.
680dX=50;Y=50
690F.N=0TOQ
700PLOT3,3,1;PLOT3,(Y/10),1;X=X+Y/3;Y=Y-X/3;N.;R.
710eX=50;Y=50
720F.N=0TOQ
730PLOT3,-3,1;PLOT3,(-Y/10),1;X=X+Y/3;Y=Y-X/3;N.;R.
740xQ=#95DF;F=3
750F.N=1TO70
760Q=Q+F;AAN=Q
770IF N%10=0;N=N+1;Q=Q-#300;F=-F;AAN=Q
780N.
790AA0=#95E0
800R.
810w$GG1="%%%%%%%";$GG2="B4$%'3B";$GG3="B$$B$$B"
820$GG4="335B%%%";$GG5="B33B$$B";$GG6="333B44B"
830R.
840vF.N=0TO6;U=N*32;U?AA(BB(R))=-(N?GGR)+290;N.;R.
850uF.N=0TO6;U=N*32;U?AA(BB(R))=255;N.;R.
860tIFBBR=2;BBR=23;GOS.j
870IFBBR=6;BBR=26;GOS.j
880IFBBR=10;BBR=30;GOS.j
890IFBBR=7;BBR=48;GOS.j
900IFBBR=16;BBR=55;GOS.j
910IFBBR=17;BBR=58;GOS.j
920IFBBR=29;BBR=68;GOS.j
930IFBBR=21;BBR=4;GOS.i
940IFBBR=33;BBR=4;GOS.i
950IFBBR=62;BBR=37;GOS.i
960IFBBR=69;BBR=35;GOS.i
970IFBBR=57;BBR=45;GOS.i
980R.
990jF.I=1TO10;LINK#81;?#80=?#80-8;WAIT;N.;?#80=160;R.
1000iF.I=1TO10;LINK#81;?#80=?#80+8;WAIT;N.;?#80=160;R.
1010sF.S=0TO100;WAIT;N.;R.
```

S·O·L·I·



Solitaire may be the loneliest game in town — but it can be a lot of fun too! This computerised version of the famous board game follows the rules of the original closely.

All you have to do is remove as many counters as you can from the play area by jumping them diagonally over each other. With any luck you should end up with just one lone counter in the centre hole of the board.

The author of this Sharp-sized version says that if you are left with 11-15 pieces you have played an average game, if you are 8-10 counters left on the board then you can rate yourself a good player. Anything below eight pieces — well that's excellent! Mr Randle has been left with only five pieces after playing his game — can you beat that?

RUNS ON A SHARP MZ-80K

BY PETER RANDLE

```
5 DIMP(8,8)
10 TEMPO 4
11 REM COMPUTER SOLITAIRE********
12 REM BY PETER RANDLE    ********
13 REM ************************
15 PRINT "■":PRINTTAB(25);"COMPUTER "
16 PRINT TAB(25);"SOLITAIRE"
17 PRINT:PRINT:PRINTTAB(5);"MAKE YOUR MOVES DIAGONALLY"
18 PRINT"& JUMP OVER 1 PIECE INTO AN EMPTY SQUARE"
19 PRINTTAB(5);"EACH MOVE CONSISTS OF TWO NUMBERS."
20 PRINT"eg JUMP FROM 27  TO 45"
21 PRINT"(ROW number then COLUMN number)"
22 PRINT:PRINT
23 PRINT"INORDER TO END,TYPE 9 for next move."
24 PRINT"************************************
25 POKE4466,19:PRINT"GOOD LUCK!!"
30 PRINT"PRESS ANY KEY TO  START then 'CR'":MUSIC"_D3_A5"
35 INPUTA$
40 PRINT"■"
45 PRINT"  1  2  3  4  5  6  7  8"
50 PRINT" ┌──┬──┬──┬──┬──┬──┬──┬──┐ "
55 PRINT"1|  |  |  |  |  |  |  |  | 1"
60 PRINT" ┌──┬──┬──┬──┬──┬──┬──┬──┐ "
65 PRINT"2|  |  |  |  |  |  |  |  | 2"
70 PRINT" ┌──┬──┬──┬──┬──┬──┬──┬──┐ "
75 PRINT"3|  |  |  |  |  |  |  |  | 3"
80 PRINT" ┌──┬──┬──┬──┬──┬──┬──┬──┐ "
85 PRINT"4|  |  |  |  |  |  |  |  | 4"
90 PRINT" ┌──┬──┬──┬──┬──┬──┬──┬──┐ "
95 PRINT"5|  |  |  |  |  |  |  |  | 5"
```

Illustration: Jon Davis

T·A·I·R·E



```
100 PRINT" ┌───┬───┬───┬───┬───┬───┬───┬───┐ "
105 PRINT"6│   │   │   │   │   │   │   │   │6"
110 PRINT" ├───┼───┼───┼───┼───┼───┼───┼───┤ "
115 PRINT"7│   │   │   │   │   │   │   │   │7"
120 PRINT" ├───┼───┼───┼───┼───┼───┼───┼───┤ "
125 PRINT"8│   │   │   │   │   │   │   │   │8"
130 PRINT" └───────────────────────────────┘ "
135 K=53369
140 FORI=1TO8:FORJ=1TO8
145 P(I,J)=K+J+(I-1)*80
150 K=K+2
155 NEXTJ:K=53369:NEXTI
160 FOR I=1TO8
165 FOR J=1TO8
170 POKEP(I,J),71
175 NEXTJ:NEXTI
180 FOR I=4TO5
185 FOR J=4TO5
190 POKE P(I,J),0
195 NEXTJ:NEXTI
200 S=0:W=0
205 POKE4466,19:PRINT"Jump from...."
210 GETF:IFF=0THEN210
211 IFF=9THEN330
212 GETG:IFG=0THEN211
213 MUSIC"‾F4":PRINTF;G
215 PRINT"To.........":MUSIC"F5"
220 GETT:IFT=0THEN220
221 GETU:IFU=0THEN221
222 MUSIC"F4":PRINTT;U
225 FORI=1TO30:POKE54167+I,0:NEXTI
230 IFABS(F-T)<>2GOTO260
235 IFABS(G-U)<>2GOTO260
236 GOSUB265:IFPEEK(P(L,M))=0THEN260
240 IF PEEK(P(F,G))=0THEN 260
245 IF PEEK(P(T,U))=71THEN260
250 IF PEEK(P(F,G))=71+PEEK(P(T,U))<>71THEN 290
260 PRINT"Illegal move.Try again":MUSIC"_D5":W=W+1:GOTO205
265 IFF>T THEN 280
270 L=F+1:IFG>UTHENM=G-1:GOTO286
275 IF G<UTHENM=G+1:GOTO286
280 L=F-1:IFG>UTHENM=G-1
285 IFG<UTHENM=G+1
286 RETURN
290 S=S+1
295 POKEP(F,G),0:POKEP(T,U),71:POKEP(L,M),0
300 POKE4466,19:PRINTSPC(25)
305 PRINTSPC(25)
310 PRINTSPC(25)
315 PRINTSPC(25)
320 PRINTSPC(25)
325 GOTO205
330 PRINT"▣":PRINT:Z=60-S
335 PRINT"You made ";S+W;" moves,but";W;" were illegal."
340 PRINT"You had  ";Z;" pieces left.":POKE4466,12
345 PRINT"DO YOU WANT ANOTHER GAME?..YES OR NO"
350 INPUTA$
355 IFA$="YES"GOTO40
360 PRINT"▣":PRINT
365 PRINT"HOPE YOU ENJOYED YOUR GAME."
370 PRINT:PRINT"BYE-BYE"
375 END
```



IMH

BY TERRY CLARK





In Egypt, during the reign of Zoser there lived a wise man named Imhotep.

Zoser desired that a great monument be built so that the Gods would grant him eternal life.

Imhotep was renowned throughout Khem, as they called their country, as a man of great intellect. The discovery of medicine and science as they know it, and the relatively new techniques of architecture were attributed to him. Therefore, Zoser chose Imhotep to erect his monument.

Upon the desert of the east the first pyramid was raised, the famous step pyramid at Saqqara. Though a long way from the perfection and sheer size of the later Great Pyramid, the step pyramid of Zoser is a good first try.

Imhotep must have been a remarkable man, possibly even worthy of the godhood granted him by later generations of Egyptians. He was revered until the very end of the culture.

In this game I have tried to simulate the frustrations involved in the construction of a pyramid. The strain on the entire country must have been great indeed. From the hundreds of thousands of people involved, to the vast amounts of grain needed to feed them, all had to be co-ordinated.

This task fell for the first time on the shoulders of Imhotep. He did not have the lessons of past failures to rely upon for guidance. He had to devise all the systems needed to perform this task. The fact that the pyramid was finished is, in itself, a testament to the intelligence of this man.

So this man, Imhotep, fulfilled the wishes of his lord and master, Zoser the Pharoah. The step pyramid has brought the memory of Zoser into the present day and made his name immortal. But also the name of Imhotep lives on.

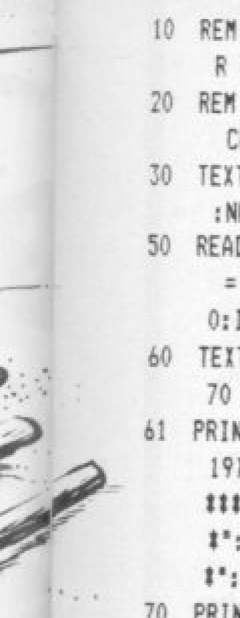
To this day no one has located his tomb. Somewhere it may still exist, waiting, as did the tomb of Tutankhamen, for the light to re-enter its now-darkened confines and illuminate the many wonders surely entombed with the great master mason Imhotep.

List of variables used in Imhotep.

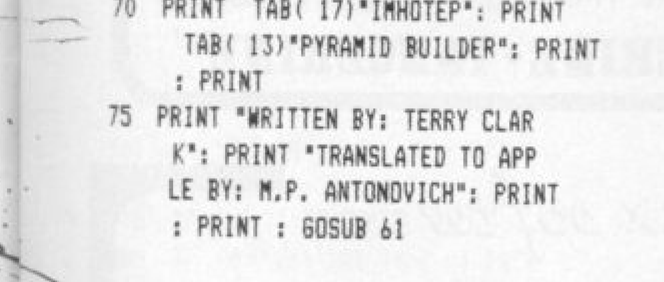
A$ – used in INPUT statements to advance the game.
B – the number of tels (of land) to be planted.
B$ – current overseer's name.
D – the number of tels flooded by the Nile.
E$ – stores the top and bottom border design.
E – used in the graphics of the Pyramid as the starting point of each course.
ER – stores the number of mistakes the player has made.
F – the end-point of each course in the Pyramid graphics.
G – FOR/NEXT loop in the pyramid graphics.
G$ – contains a string of three pyramids as used in the border.
H – the number of lines PRINTed on the screen. Used to avoid scrolling in the case of an eventful year.
I – the number of storehouses allotted to fed the work force.
IM$ – the name and honorifics of IMHOTEP.
J – the number of storehouses to feed the general population.
K – the random harvest.
L – the number of people fed in the general population.
M – the number of people fed on the work force.
N – the number of courses completed on the Pyramid.
O – the number of storehouses either claimed or given by the priests.
P – the total population of Egypt.
Q – random chance of plague, tribute or Zoser's campaign.
R – increase in population for each year.
S – total number of storehouses.
T – time in years.
U – random chance of rebellion by the work force.
U1 – temporary counter of those killed in rebellion.
V – the amount of tribute from Nubia.
V1 – temporary counter of population killed due to various causes.
V$ – used in line # 660 to call a new game.
W – the number of people in the work force.
WA – the chance of war, invasion, Minoans, rebellion and a bride for Pharoah.
X – loop in Pyramid graphics used to draw each course of stone.
Y – level of each course in Pyramid graphics.
Z – chance of collapse.
ZZ – timing loop on "NEW GAME" input at end of game.

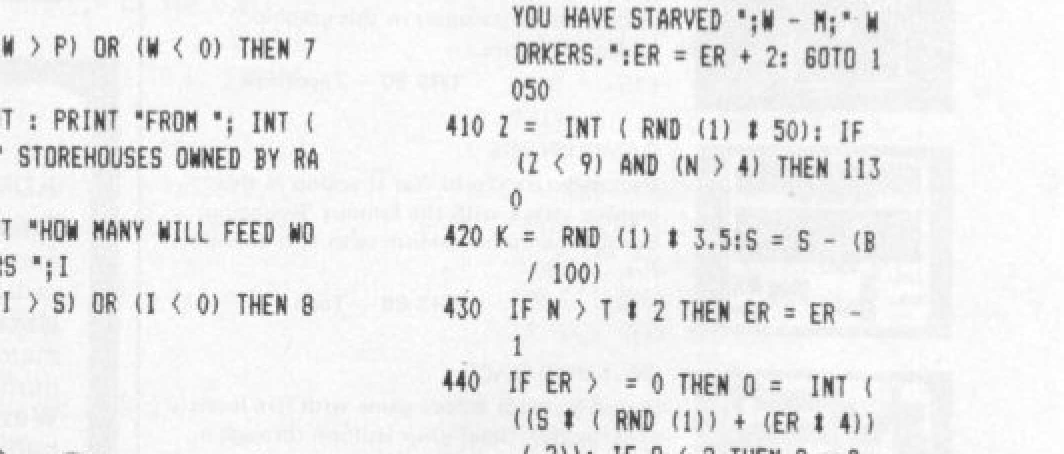
IOTEP

RUNS ON AN APPLE IN 16K

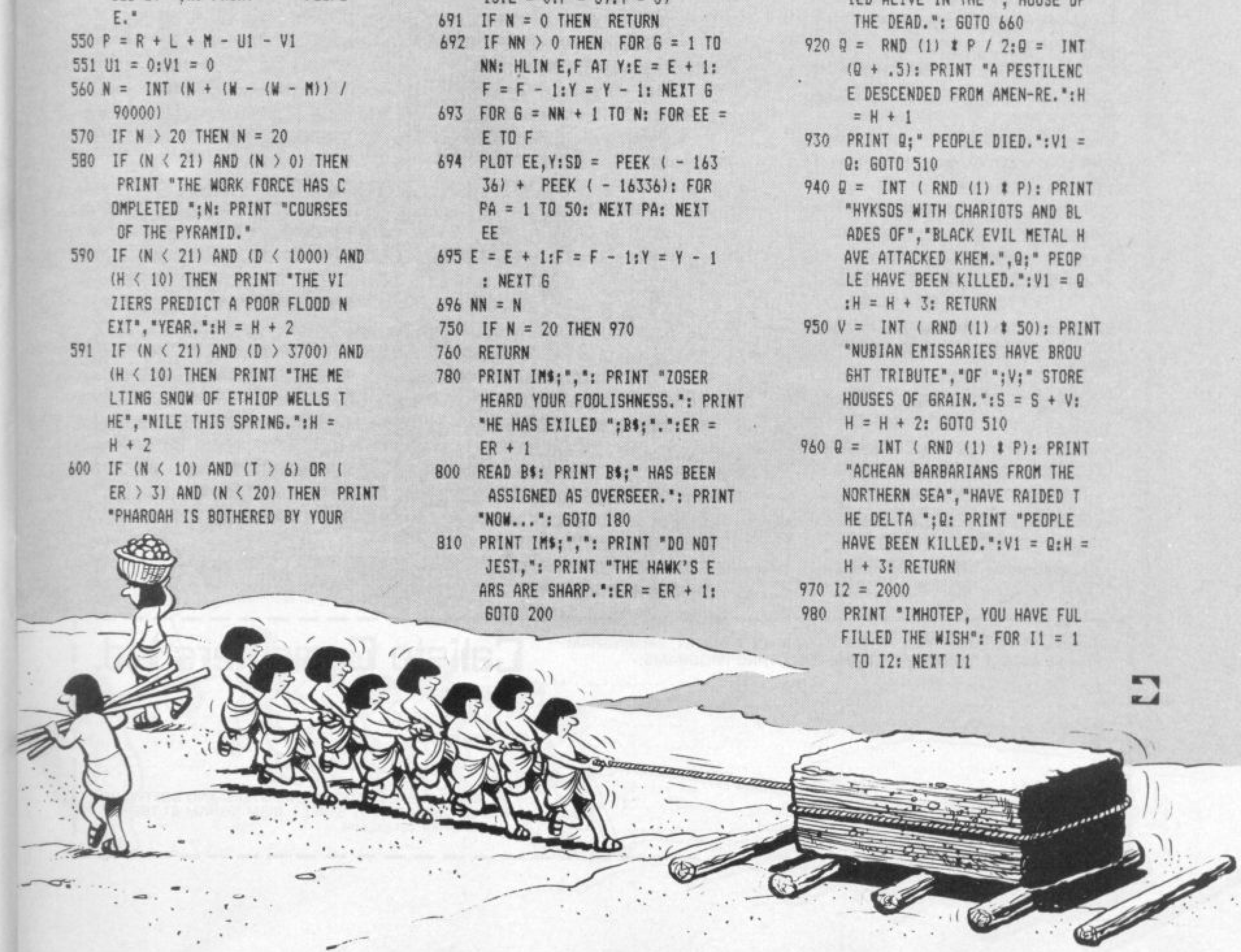


```
10  REM  IMHOTEP - PYRAMID BUILDE
      R * VERSION 2.5
20  REM  COPYRIGHT (C) 1980 TERRY
      CLARK COLUMBUS IN
30  TEXT : HOME : GR : GOSUB 1200
     :NN = 0
50  READ B$:P = 300000:D = 2500:S
     = 330:T = 0:W = 0:ER = 0:N =
     0:IM$ = "IMHOTEP"
60  TEXT : HOME : GOSUB 61: GOTO
     70
61  PRINT  TAB( 20)"*": PRINT  TAB(
     19)"***": PRINT  TAB( 18)"**
     ***": PRINT  TAB( 17)"******
     *": PRINT  TAB( 16)"********
     *": PRINT : PRINT : RETURN
70  PRINT  TAB( 17)"IMHOTEP": PRINT
     TAB( 13)"PYRAMID BUILDER": PRINT
     : PRINT
75  PRINT "WRITTEN BY: TERRY CLAR
     K": PRINT "TRANSLATED TO APP
     LE BY: M.P. ANTONOVICH": PRINT
     : PRINT : GOSUB 61
80  FOR I2 = 1 TO 5000: NEXT I2: HOME
85  PRINT "++++A DECREE FROM ZOSE
     R,": PRINT "    THE GOLDEN H
     ORUS,": PRINT "    BULL OF K
     HEM.++++"
90  PRINT : PRINT "TO IMHOTEP, MA
     STER MASON:"
100  PRINT "IMHOTEP, THE PHAROAH
     HAS COMMANDED A","PYRAMID TO
      BE BUILT.  THE HORUS DESIRE
     S","THIS GLORY TO HIS NAME T
     O BE FINISHED","WITHIN A PER
     IOD OF TWELVE YEARS."
130  PRINT "YOUR OVERSEER IS ";B$
     : PRINT "HE IS TO OBEY YOUR
     COMMANDS.": PRINT : PRINT
140  PRINT "HIT ANY KEY TO CONTIN
     UE ";: GET A$
141  HOME
142  IF T = 0 THEN 163
145  GOSUB 690
150  VTAB 21: PRINT "WORK SITE AF
     TER ";T;" YEARS."
161  GOSUB 162: GOTO 163
162  FOR I1 = 1 TO 5000: NEXT I1:
      RETURN
163  TEXT : HOME
164  PRINT "POPULATION OF KHEMI -
      "; INT (P)
165  PRINT "PHAROAH OWNS "; INT (
     S);" GRAIN STOREHOUSES.": PRINT
     "NILE FLOODED "; INT (D);" T
     ELS OF LAND."
180  PRINT : PRINT "# OF PEOPLE Y
     OU WISH ON WORK FORCE": INPUT
     W
190  IF (W > P) OR (W < 0) THEN 7
     80
200  PRINT : PRINT "FROM "; INT (
     S);" STOREHOUSES OWNED BY RA
     "
210  INPUT "HOW MANY WILL FEED WO
     RKERS ";I
220  IF (I > S) OR (I < 0) THEN 8
     10
230 P = P - W:S = S - I
250  PRINT : PRINT "FROM "; INT (
     S);" REMAINING STOREHOUSES,"
260  PRINT "HOW MANY WILL FEED ";
     INT (P): INPUT "REMAINING P
     EOPLE ";J
270  IF (J > S) OR (J < 0) THEN 8
     20
280 S = S - J
290  PRINT : PRINT "FROM "; INT (
     D);" TELS, HOW MANY DO YOU"
300  INPUT "WISH TO PLANT ";B
320  IF B > D OR B < 0 THEN 840
330  IF B > S * 100 THEN 870
340  IF B > P * 10 THEN 880
350  TEXT : HOME :H = 0: GOSUB 61
360 M = I * 1000: IF M - W > 0 THEN
     M = W
370 L = J * 1000:R = L - P: IF R <
     0 THEN R = 0
380 R = R +  INT ( RND (1) * 1000
     )
385  IF P - L > 0 THEN  PRINT "YO
     U HAVE STARVED ";P - L;" PEO
     PLE.":ER = ER + 1
386  IF L - P > 0 THEN L = P
390  IF P - L > P * .45 THEN 900
400 U =  INT ( RND (1) * 40): IF
     U < 4 THEN 1050
401  IF (M - W) < 0 THEN  PRINT "
     YOU HAVE STARVED ";W - M;" W
     ORKERS.":ER = ER + 2: GOTO 1
     050
410 Z =  INT ( RND (1) * 50): IF
     (Z < 9) AND (N > 4) THEN 113
     0
420 K =  RND (1) * 3.5:S = S - (B
     / 100)
430  IF N > T * 2 THEN ER = ER -
     1
440  IF ER > = 0 THEN O =  INT (
     ((S * ( RND (1)) + (ER * 4))
     / 2)): IF O < 2 THEN S = S -
     O
450  IF ER < 0 THEN O =  INT (S *
     ( RND (1)) / 10):S = S + O
460  IF S < 0 THEN S = 0
470 S = S + ((B * K) / 10):T = T +
     1
480 D =  INT ( RND (1) * 4000 + (
     O * .5)):Q =  RND (1) * 30: IF
```





```
   Q > 22 THEN 950
481  IF (Q > 12) AND (Q < 18) THEN
      1010
482  IF Q < 8 THEN 920
490 WA =  RND (1) * 300: IF WA <
      19 THEN  GOSUB 940
491  IF WA > 282 THEN  GOSUB 1040
492  IF (WA < 210) AND (WA > 165)
      THEN  GOSUB 960
493  IF (WA > 75) AND (WA < 130) THEN
      GOSUB 1020
494  IF (WA > 255) AND (WA < 260)
      THEN  GOSUB 1030
510  PRINT "THE HARVEST THIS YEAR
      WAS ";K / 10: PRINT "    ST
     OREHOUSES PER TEL."
520  IF ER > = 0 THEN 530
521  IF (ER < 0) AND (O > 1) THEN
      PRINT "THE PRIESTS OF AMEN
     GAVE ZOSER,";O: PRINT "    S
     TOREHOUSES OF GRAIN.":H = H +
     1: GOTO 540
530  IF O < 2 THEN  GOTO 540
531  IF ER > = 0 THEN  PRINT O;"
      STOREHOUSES OF GRAIN WERE C
     LAIMED": PRINT "    BY THE P
     RIESTS OF AMEN.":H = H + 1
540  PRINT "THE POPULATION INCREA
     SED BY ";R: PRINT "    PEOPL
     E."
550 P = R + L + M - U1 - V1
551 U1 = 0:V1 = 0
560 N =  INT (N + (W - (W - M)) /
     90000)
570  IF N > 20 THEN N = 20
580  IF (N < 21) AND (N > 0) THEN
      PRINT "THE WORK FORCE HAS C
     OMPLETED ";N: PRINT "COURSES
      OF THE PYRAMID."
590  IF (N < 21) AND (D < 1000) AND
     (H < 10) THEN  PRINT "THE VI
     ZIERS PREDICT A POOR FLOOD N
     EXT","YEAR.":H = H + 2
591  IF (N < 21) AND (D > 3700) AND
     (H < 10) THEN  PRINT "THE ME
     LTING SNOW OF ETHIOP WELLS T
     HE","NILE THIS SPRING.":H =
     H + 2
600  IF (N < 10) AND (T > 6) OR (
     ER > 3) AND (N < 20) THEN  PRINT
     "PHAROAH IS BOTHERED BY YOUR
     INEFFICIENCY":H = H + 2
610  IF ER > 7 THEN  PRINT "HE HA
     S DECREED, THAT FOR YOUR MIS
     TAKES,","YOU WILL BE EXILED
      TO THE RED LAND OF","THE EAS
     T.": GOTO 660
620  IF H < 2 THEN  PRINT IM$;","
     : PRINT "AN UNEVENTFUL YEAR.
     "
621  IF (H > 8) AND (H < 14) THEN
      PRINT IM$;",": PRINT "A VER
     Y EVENTFUL YEAR."
624  PRINT "HIT ANY KEY TO CONTIN
     UE ";: GET A$
625  IF T = 6 THEN  GOSUB 1330
630  GOSUB 690
640  IF T > = 12 THEN 890
650 S =  INT (S * 10 + .5) / 10:D
      =  INT (D * 10 + .5) / 10:P
      =  INT (P * 10 + .5) / 10: GOTO
     150
660  PRINT "IMHOTEP WILL YOU TRY
     AGAIN? (Y/N) ";: GET V$
661  IF V$ = "Y" THEN  RUN
662  IF V$ = "N" THEN  TEXT : HOME
     : END
670  GOTO 660
690  HOME : GR : GOSUB 1200: COLOR=
     13:E = 0:F = 39:Y = 39
691  IF N = 0 THEN  RETURN
692  IF NN > 0 THEN  FOR G = 1 TO
     NN: HLIN E,F AT Y:E = E + 1:
     F = F - 1:Y = Y - 1: NEXT G
693  FOR G = NN + 1 TO N: FOR EE =
     E TO F
694  PLOT EE,Y:SD =  PEEK ( - 163
     36) +  PEEK ( - 16336): FOR
     PA = 1 TO 50: NEXT PA: NEXT
     EE
695 E = E + 1:F = F - 1:Y = Y - 1
     : NEXT G
696 NN = N
750  IF N = 20 THEN 970
760  RETURN
780  PRINT IM$;",": PRINT "ZOSER
     HEARD YOUR FOOLISHNESS.": PRINT
     "HE HAS EXILED ";B$;".":ER =
     ER + 1
800  READ B$: PRINT B$;" HAS BEEN
      ASSIGNED AS OVERSEER.": PRINT
     "NOW...": GOTO 180
810  PRINT IM$;",": PRINT "DO NOT
      JEST,": PRINT "THE HAWK'S E
     ARS ARE SHARP.":ER = ER + 1:
      GOTO 200
820  PRINT IM$;",": PRINT "I, ";B
     $;", WARN YOU NOT":ER = ER +
      1
830  PRINT "TO MOCK PHAROAH ZOSER
     . HIS FLAIL IS","SWIFT.": GOTO
     250
840  PRINT IM$;",": PRINT "PHAROA
     H HAS KILLED ";B$: PRINT "YO
     UR OVERSEER.":ER = ER + 1
850  ONERR  GOTO 1190
860  READ B$: PRINT "I AM ";B$;"
     YOUR NEW OVERSEER.": PRINT "
     NOW...": GOTO 290
870  PRINT "THERE IS ONLY ENOUGH
     GRAIN TO PLANT ";S * 100 - 1
     : PRINT "TELS.":ER = ER + 1:
      IF S * 100 - 1 < 0 THEN 901
871  GOTO 290
880  PRINT "THERE ARE ONLY ENOUGH
      PEOPLETO PLANT": PRINT P *
     10;"TELS.":ER = ER + 1: GOTO
     290
890  PRINT "YOU HAVE RUN OUT OF T
     IME, ZOSER WANTS","YOUR HEAD
     .": GOTO 660
900  REM  YOU KILLED TOO MANY PEO
     PLE
901  PRINT "ZOSER WANTS YOU MUMIF
     IED ALIVE IN THE ","HOUSE OF
      THE DEAD.": GOTO 660
920 Q =  RND (1) * P / 2:Q =  INT
     (Q + .5): PRINT "A PESTILENC
     E DESCENDED FROM AMEN-RE.":H
      = H + 1
930  PRINT Q;" PEOPLE DIED.":V1 =
     Q: GOTO 510
940 Q =  INT ( RND (1) * P): PRINT
     "HYKSOS WITH CHARIOTS AND BL
     ADES OF","BLACK EVIL METAL H
     AVE ATTACKED KHEM.",Q;" PEOP
     LE HAVE BEEN KILLED.":V1 = Q
     :H = H + 3: RETURN
950 V =  INT ( RND (1) * 50): PRINT
     "NUBIAN EMISSARIES HAVE BROU
     GHT TRIBUTE","OF ";V;" STORE
     HOUSES OF GRAIN.":S = S + V:
     H = H + 2: GOTO 510
960 Q =  INT ( RND (1) * P): PRINT
     "ACHEAN BARBARIANS FROM THE
     NORTHERN SEA","HAVE RAIDED T
     HE DELTA ";Q: PRINT "PEOPLE
     HAVE BEEN KILLED.":V1 = Q:H =
     H + 3: RETURN
970 I2 = 2000
980  PRINT "IMHOTEP, YOU HAVE FUL
     FILLED THE WISH": FOR I1 = 1
      TO I2: NEXT I1
```



ATARI SOFTWARE

NEW NEW NEW NEW

MISSION: ASTEROID: An asteroid is about to hit the earth and destroy it. It is your mission, as an astronaut, to rocket to the asteroid and blow it up before it reaches Earth. Over a hundred full 21-colour hi-res graphics. An exciting graphic game that will challenge your imagination and test your creativity every step of the way. (D) **£22.25**

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ULYSSES AND THE GOLDEN FLEECE: Journey back in time to the days of Greek mythology, with this brand new game from On-Line Systems. Superb program, lots of fun. (D) **£31.50**

JAW-BREAKER: This arcade game takes you to the sweet shop for a wild game of tag. If you can eat all the sweets the kids will stop bothering you. Full colour hi-res graphics. 16K (C) or (D) **£23.95**

CROSSFIRE: They have landed and are taking over the city. Steadily they are making their way across the city, destroying all in their path. If you're going to live you'll have to concentrate and don't get caught in the Crossfire. Hi-res graphics. Excellent arcade challenge. (D) **£23.95**

MOUSKATTACK: Join in the fun as ace plumber Larry Bain of Rodent Rooter Plumbing Service. He tries his best to pipe the sewers of "Rat Alley" which has the biggest rat population in the world. An unbeatable blend of arcade action and quick-thinking strategy. (D) **£31.50**

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PROTECTOR: This game is fantastic. Great hi-res colour graphics. Arcade type game with loads of action as well as tactics. Save the people from the flying saucer, then save them from the volcano. This is a must for all Atari owners. 32K (C) **£23.00**

CHICKEN: A crazy fox is dropping eggs through a maze of moving slots. Control your chicken to catch the eggs in a truck. But watch out — missed eggs hatch into chicks. Step on a chick and the farmer will ring your neck. Lots of fun. Action packed hi res graphics. 16K (C) **£23.00**

DODGERACER: Speed round the circuit controlling your racing car, but don't crash into your opponent. Great fun, hi-res graphics. 16K (C) **£19.25**

NUKE SUB/GALAXY DEFENDER: Lots of action in both of these action packed arcade type games. Superb graphics, loads of fun. Excellent value. Both games on one tape for only 16K (C) **£16.50**

ZORK I: The great underground empire confronts you with perils and predicaments ranging from the mystical to the macabre, as you strive to discover the twenty treasures of Zork and escape with them and your life. An interlogic probe adventure. 32K (D) **£30.95**

ZORK II: The Wizard of Frobozz takes you into new depths of the subterranean realm. There you'll meet the wizard who will attempt to confound your quest with his capricious powers. 32K (D) **£30.95**

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SHOOTING GALLERY: Use your skill to shoot away at the owls, ducks, rabbits and pipes moving across the screen. But watch out for the flying duck, or it'll eat your bullets. All the sound and action of a carnival arcade complete with the sounds of a calliode. 16K (C) **£26.25**

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ACTION QUEST: Action Quest is a real time adventure game. You, represented as a ghost, move from room to room in an attempt to capture valuable prizes while eluding monsters and solving puzzles. An excellent graphics adventure game. 16K (C) **£19.50**

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Star Warrior: Walk, jump — even fly — over swamps, forests and mountains with scrolling map graphics. Excellent graphics. Superb strategy game in which you try to free an occupied planet. **32K (C) £29.95**

Temple of Apshai: Project yourself into the labyrinth. See and touch the treasures, hear and smell the creatures. Discover for yourself the fantasy of Apshai. Excellent, award-winning game. **32K (C) £29.95**

Upper Reaches of Apshai: Continue the adventures of Apshai. Four levels, over 150 rooms, gardens etc. Monsters and evil nobglobins. This game requires Temple of Apshai to play. **32K (C) £14.95**

Rescue at Rigel: Can you rescue the 10 prisoners before your power pack is depleted? Can you get back to your rendezvous point in time? Can you escape the dreaded clutches of the unmerciful High Tollah. **32K (C) £22.45**

Invasion Orion: One-on-one starship combat to full scale Armageddon in this challenging and exciting space tactical warfare simulation. Good graphics and great versatility. **24K (C) £18.75**

Datestones of Ryn: Can you find and retrieve the datestones in the seemingly endless maze of rooms full of horrors. Great adventure role playing game. **32K (C) £14.95**

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5. **THE COUNT** .... **24K (C) £16.50**
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7. **MYSTERY FUN HOUSE** .... **24K (C) £16.50**
8. **PYRAMID OF DOOM** .... **24K (C) £16.50**
9. **GHOST TOWN** .... **24K (C) £16.50**
10. **SAVAGE ISLAND PART I** .... **24K (C) £16.50**
11. **SAVAGE ISLAND PART II** .... **24K (C) £16.50**
12. **GOLDEN VOYAGE** .... **24K (C) £16.50**

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DISPLAY LISTS: Teaches you how to alter the screen format of small and large text on the screen together and high and low res graphics. **16K (C) £13.95**

HORIZONTAL/VERTICAL SCROLLING: Enables graphics or text to be moved up, down or sideways. You could move only the text on the bottom half of the screen or create a map and scroll smoothly over it. **16K (C) £13.95**

PAGE FLIPPING: Learn how to have the computer draw the next page you want to see while you are still looking at the previous page then flip to it instantly. A very useful program. **16K (C) £13.95**

BASICS OF ANIMATION: This program shows you how to animate simple shapes (with sound) using Print & Plot commands and also has a nice Player/Missile graphics game you can play with. **24K (C) £13.95**

PLAYER/MISSILE GRAPHICS: This program shows you how to create a simple shape called a player, then takes you through over 25 examples to create a complete business application and a small game. **32K (C) £19.95**

GALACTIC CHASE: A fast action, arcade type game employing hi-res colour graphics. Wave after wave of attacking aliens must be destroyed in this 'Galaxian' type game. The display is excellent. 16K (C) £15.95

CRYPTS OF TERROR: An excellent graphics based adventure game. Explore 50 crypts, slay the monsters, find the ring and the key to the next level. An excellent, absorbing game employing great colour graphics. 16K (C) £24.95

MURDER AT AWESOME HALL: Question suspects, search for clues, find the murder weapon, as you wander through the doors of 'Awesome Hall' trying to solve the murder of the Colonel. Good graphics and excellent game features. **16K (C) £14.50**

GHOST HUNTER: Rid the mansion on Huckleberry Hill of Ghosts. An exciting, fast action, arcade type game using excellent sound and graphics. **16K (C) £19.95**

REARGUARD: A high res colour graphics arcade type game in the "Defender" style. Lots of action. Very difficult at the higher skill levels. **16K (C) £16.50**

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```
981  PRINT "OF PHAROAH.  YOUR REW
     ARD IS THE GREAT": FOR I1 =
     1 TO I2: NEXT I1
982  PRINT "BOON OF BEING ENTOMBE
     D WITH YOUR LORD": FOR I1 =
     1 TO I2: NEXT I1
983  PRINT "AND MASTER, ZOSER, TH
     E GOLDEN HORUS.": FOR I1 = 1
      TO I2: NEXT I1: GOTO 660
1010 V =  INT ( RND (1) * 50): PRINT
     "A MILITARY CAMPAIGN LED BY
     ZOSER HAS","BROUGHT AN ADDIT
     IONAL ";V;" TELS": PRINT "OF
      LAND INTO THE DOUBLE-KINGDO
     M.":D = D + V:H = H + 3: GOTO
     510
1020 V =  INT ( RND (1) * 50 + 20
     ): PRINT "MINOAN MERCHANTS H
     AVE BROUGHT ";V: PRINT "STOR
     EHOUSES OF GRAIN TO TRADE FO
     R": PRINT "METHODS OF BUILDI
     NG AS PRACTICED IN","KHEMI."
     :S = S + V:H = H + 4: RETURN

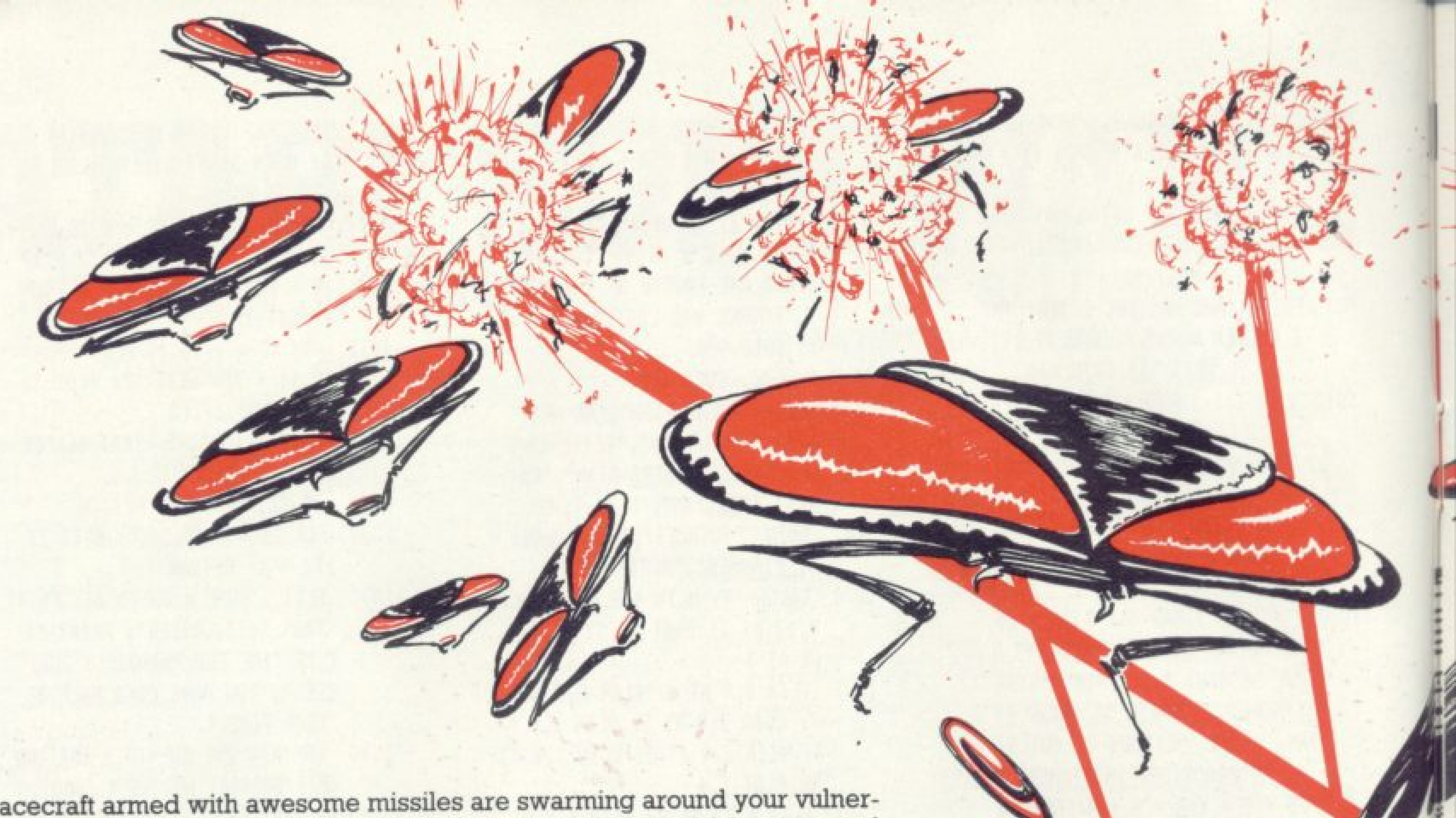
1030 V =  INT ( RND (1) * 100): PRINT
     "THE PHAROAH'S NEW SYRIAN BR
     IDE BROUGHT","A DOWRY OF ";V
     ;" STOREHOUSES": PRINT "OF G
     RAIN.":S = S + V:H = H + 3: RETURN
1040 V =  INT ( RND (1) * W):V1 =
     V:W = W - V: PRINT "A FANATI
     CAL REBEL-PRIEST HAS ESCAPED
     ","WITH ";V;" WORKERS INTO T
     HE": PRINT "WILDERNESS OF TH
     E SINAI.":H = H + 3: RETURN

1050  IF W = 0 THEN  RETURN
1060 U =  INT ( RND (1) * 100): PRINT
     "THE WORK FORCE HAS REVELLED
     .  ";U
1070  PRINT "WORKERS, AND ";B$;",
      THE OVERSEER,": PRINT "WERE
      KILLED BY"
1080  PRINT "PHAROAHS'S VICTORIOU
     S ANUBIS SQUADRON."
1090 U1 = U:W = W - U
1110  READ B$: PRINT "THE GREAT Z
     OSER HAS CHOSEN ";B$: PRINT
     "TO BE YOUR NEW OVERSEER.":H
      = H + 6: GOTO 420
1130 Z =  INT ( RND (1) * 2 + 2):
     N = N - Z:W = W -  INT (W *
     .25):M = W + P: IF NN > N THEN
     NN = N
1140  PRINT Z;" COURSES OF THE PY
     RAMID HAVE": PRINT "COLLAPSE
     D AND ONE-FOURTH OF THE WORK
     ","FOURCE WAS LOST.":H = H +
     3: GOTO 420
1160 N = 20: GOTO 690
1180  DATA  "MENE-PTAH","RA-ANX-T
     ETA","ATUM-ATON","SETEP-EN-R
     E","RAMOSE","MERI-ATUM","KA-
     RES","MAATTUM","MERI-TEHU"
1181  DATA  "TOTHMES","RE-MES-SES
     ","PTAHMES","MERIPASHTU"
1200  COLOR= 9: HLIN 4,8 AT 1: HLIN
     8,12 AT 2: PLOT 12,3: HLIN 7
     ,8 AT 3
1202  VLIN 2,9 AT 6: VLIN 5,9 AT
     7: VLIN 2,9 AT 5: VLIN 2,9 AT
     4: VLIN 2,9 AT 3: VLIN 3,9 AT
     2: PLOT 1,4
1203  HLIN 8,12 AT 9: HLIN 4,5 AT
     19: HLIN 4,5 AT 20: HLIN 15,
     16 AT 20: HLIN 14,15 AT 19: HLIN
     3,8 AT 21: HLIN 14,19 AT 21
1204  COLOR= 1: HLIN 13,15 AT 5: PLOT
     15,6: VLIN 5,21 AT 13: VLIN
     11,15 AT 2: VLIN 11,15 AT 39

1205  FOR ZP = 1 TO 6: PLOT 5 + Z
     P,9 + ZP: PLOT 3 + ZP,9 + ZP
     : NEXT ZP: PLOT 8,10
1206  FOR YP = 1 TO 3: FOR ZP = 1
      TO YP * 2 - 1: PLOT 2 + ZP,
     16 + ZP - YP * 2: NEXT ZP,YP
1207  COLOR= 3: HLIN 3,6 AT 16: HLIN
     3,5 AT 17: HLIN 3,5 AT 18: HLIN
     8,13 AT 16: HLIN 10,13 AT 17
     : HLIN 11,14 AT 18
1210  HLIN 28,31 AT 16: HLIN 27,3
     0 AT 17: HLIN 27,29 AT 18: HLIN
     35,38 AT 16: HLIN 35,38 AT 1
     7: HLIN 35,37 AT 18
1211  COLOR= 9: HLIN 33,37 AT 1: HLIN
     33,38 AT 2: HLIN 33,34 AT 3:
      HLIN 36,39 AT 3: HLIN 36,39
      AT 4: HLIN 23,26 AT 21: HLIN
     33,38 AT 21
1212  VLIN 5,9 AT 38: VLIN 5,9 AT
     33: VLIN 4,8 AT 34: VLIN 6,8
      AT 35: VLIN 7,9 AT 36: HLIN
     27,33 AT 9: PLOT 32,8
1213  HLIN 27,30 AT 5: HLIN 30,31
      AT 6: HLIN 31,32 AT 6: HLIN
     26,28 AT 19: HLIN 25,26 AT 2
     0: HLIN 36,37 AT 19: HLIN 36
     ,37 AT 20
1214  COLOR= 1: FOR XP = 1 TO 6: PLOT
     35 - XP,9 + XP: PLOT 37 - XP
     ,9 + XP: PLOT 39 - XP,9 + XP
     : NEXT XP
1215  FOR XP = 1 TO 4: PLOT 39 -
     XP,11 + XP: NEXT XP: PLOT 38
     ,14: PLOT 37,15
1220  VTAB 21: PRINT  TAB( 16)"IM
     HOTEP"
1225  IF TZ = 1 THEN  RETURN
1230  FOR ZZ = 0 TO 5000: NEXT ZZ
     :TZ = 1: RETURN
1330  TEXT : HOME : GOSUB 61: PRINT
      TAB( 16)"JUBILEE": PRINT "I
     T IS TIME FOR PHARDAH'S JUBI
     LEE.","YOU HAVE USED HALF OF
      YOUR TIME."
1340  IF (N = 20) OR ((N > 10) AND
     (P > 300000) AND (S * 1000 >
     P) AND (ER < 2)) THEN  PRINT
     IM$: PRINT "PHAROAH IS PLEAS
     ED WITH YOUR": PRINT "PERFOR
     MANCE SO FAR AND BESTOWS A G
     REAT","HONOR ON YOU. FROM TH
     IS MOMENT YOU ARE","KNOWN AS
      'GREAT LORD IMHOTEP'.
1345  IF (N = 20) OR ((N > 10) AND
     (P > 300000) AND (S * 1000 >
     P) AND (ER < 2)) THEN ER =  -
     1:IM$ = "GREAT LORD IMHOTEP"
     : GOTO 1370
1350  IF (N < 7) AND (ER > 3) AND
     (P < 300000) AND (S * 1000 <
      = P + 50) THEN  PRINT IM$: PRINT
     "PHAROAH IS DISPLEASED WITH
     YOU AND","DESIRES FOR YOU TO
      SUFFER THE DISHONOR","OF BE
     ARING THE TITLE 'IMHOTEP THE
     ","INCOMPETENT'."
1355  IF (N < 7) AND (ER > 3) AND
     (P < 300000) AND (S * 1000 <
      = P + 50) THEN ER = ER + 1:
     IM$ = "IMHOTEP THE INCOMPETE
     NT": GOTO 1370
1360  PRINT IM$: PRINT "PHAROAH F
     EELS YOU HAVE NOT PUT FORTH
     A","GOOD EFFORT AND DISIRES
     TO REMIND YOU","OF YOUR RESP
     ONSIBILITIES WITH THE","TITL
     E 'IMHOTEP-HORUS-WATCHES'.":
     IM$ = "IMHOTEP-HORUS-WATCHES
     "
1370  PRINT "HIT ANY KEY TO CONTI
     NUE ";: GET A$: RETURN
```



Illustration: Dorian Cross



Spacecraft armed with awesome missiles are swarming around your vulnerable cities on a planet at war. Can you protect the population of the cities and prevent the apocalypse?

In this game — based on the popular arcade version — you have to protect four cities from numerous marauding aliens.

To do this, you have three missile bases, each initially equipped with 10 missiles. These, of course, must also be defended against the aliens, because, when a base is hit, all its missiles are destroyed. The aliens are represented as white dots, and leave a red radiation trail. When hit they are worth 10 points.

A bomb sight, in the form of a cross, can be controlled in four directions from the keyboard — F=left, G=right, T=up, V=down. Once one of these is pressed, the sight will continue to move in the appropriate direction until another key is pressed.

To fire, press the 1, 2, or 3 keys depending on which missile base you wish to use. Whey you fire, your missile will streak up to the centre of the sight, and a multiple explosion will occur, giving you more chance of destroying the aliens. However, to compensate for this, as they move down the aliens can divide into two or more.

Once you have destroyed all the aliens, or lost all your missiles, the screen clears, and then displays any bonus points — 10 for each remaining missile, and 50 for each city. If you have no cities left, the game ends after a suitable display, else you proceed to the next, faster, attack wave.

The game requires a minimum 32K machine, with Basic V5.0 H, and the colour high resolution board.



BY A. M. PENNELL

```
10 REM RML 380Z MISSILE COMMAND
20 REM
30 REM BY A.PENNELL
40 RANDOMIZE
50 GOTO 620
60 REM MAIN LOOP
70 GOSUB 120
80 IF J=NI GOTO 1020
90 IF FF THEN GOSUB 350
100 GOTO 70
110 REM MOVE ALIENS
120 I=I+1:IF I>NI THEN I=1
130 IF C(I)=0 THEN IF RND(1)>.5 THEN RETURN ELSE GOTO 120
140 CALL R$,X(I),Y(I),VARADR(Q)
150 IF Q=0 AND Y(I)<95 THEN C(I)=0:J=J+1:V=V+10:PLOT 0,57,STR$(V):RETURN
160 CALL P$,X(I),Y(I),4
```

MISSILE C

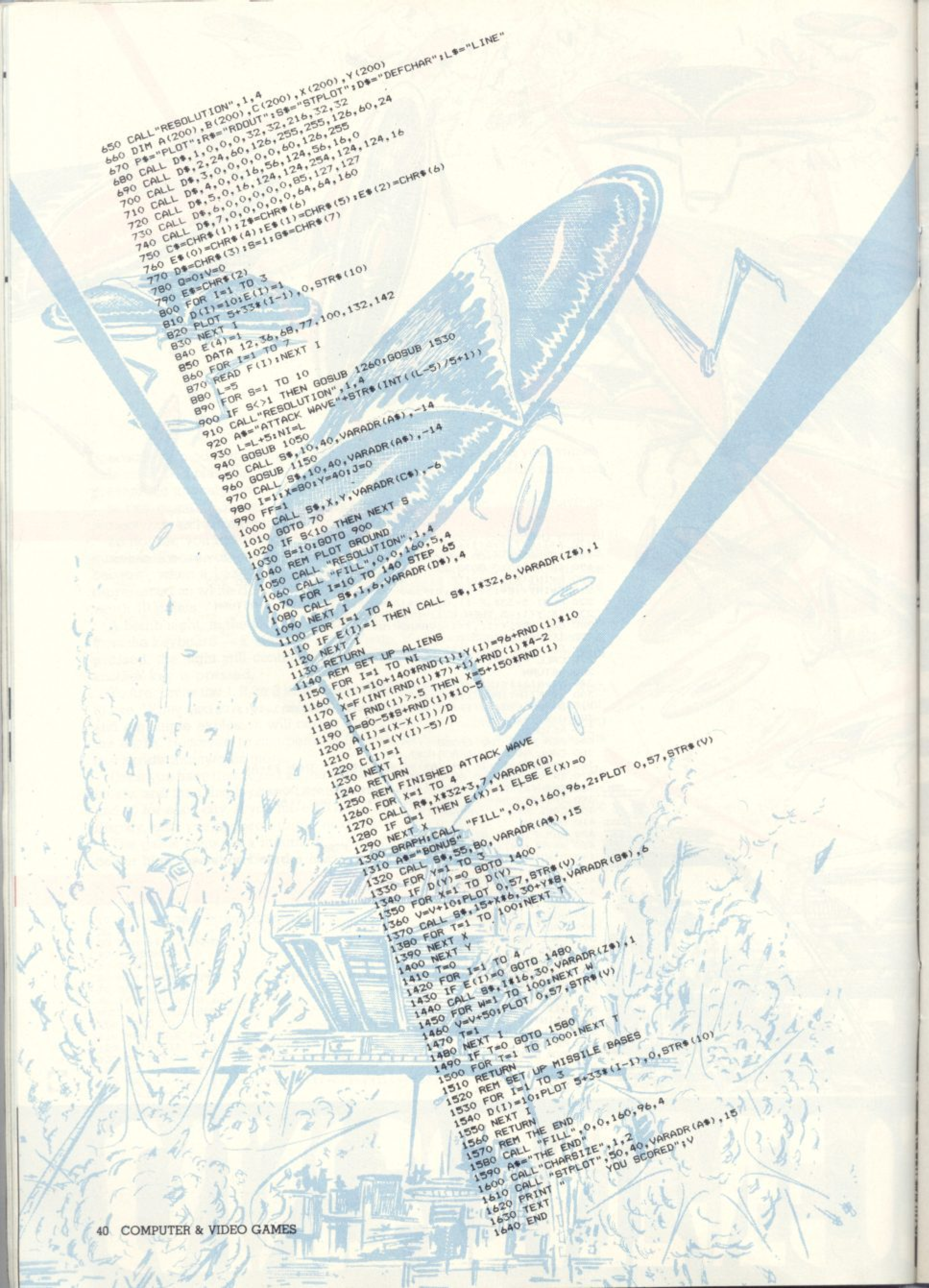




RUNS ON A 380-Z IN 32K

```
170 X(I)=X(I)+A(I):Y(I)=Y(I)-B(I)
180 IF RND(1)<.05 AND L*2>NI AND Y(I)<92 AND Y(I)>20 THEN GOSUB 290
190 IF Y(I)>10 GOTO 230
200 E=INT(X(I)/4):IF E<>3 AND E<>19 AND E<>36 GOTO 230
210 F=INT((E+13)/16):D(F)=0
220 PLOT 5+33*(F-1),0,STR$(0)+" ":C(I)=0:J=J+1:RETURN
230 IF Y(I)<5 THEN C(I)=0:J=J+1:RETURN
240 CALL R$,X(I),Y(I),VARADR(Q)
250 IF Q=1 GOTO 570
260 CALL L$,X(I),Y(I)
270 CALL P$,X(I),Y(I),15
280 RETURN
290 NI=NI+1:X(NI)=X(I):Y(NI)=Y(I)
300 XX=F(INT(RND(1)*7)+1)
310 D=(80-S*5)*Y(I)/80:A(NI)=(X-X(I))/D:B(NI)=(Y(I)-5)/D
320 C(NI)=1
330 RETURN
340 REM MOVE THE CROSS
350 CALL S$,X,Y,VARADR(C$),-6
360 A$=GET$(1):IF VAL(A$)=0 AND A$<>"" THEN B$=A$
370 IF VAL(A$)<>0 GOTO 430
380 X=X-4*((B$="G" AND X<156)-(B$="F" AND X>0))
390 Y=Y+4*((B$="V" AND Y>12)-(B$="T" AND Y<85))
400 CALL S$,X,Y,VARADR(C$),-6
410 RETURN
420 REM FIRING AT THEM
430 W=VAL(A$):IF W>3 OR D(W)=0 GOTO 380
440 D(W)=D(W)-1:IF D(1)=0 AND D(2)=0 AND D(3)=0 THEN FF=0
450 B$=""
460 CALL P$,-50+W*65,10,-12
470 CALL L$,X+3,Y-1
480 FOR Z=0 TO 2
490 GOSUB 120:GOSUB 120
500 CALL S$,X-1,Y-1,VARADR(E$(Z)),15
510 CALL S$,X-1,Y-1,VARADR(E$(Z)),0
520 NEXT Z
530 PLOT 5+33*(W-1),0,STR$(D(W))+" "
540 CALL P$,-50+W*65,10,-12:CALL L$,X+3,Y-1
550 CALL S$,X,Y,VARADR(C$),-6
560 RETURN
570 C(I)=0:J=J+1
580 A=INT(X(I)/32)*32
590 CALL S$,A,6,VARADR(Z$),0
600 RETURN
610 REM SET UP
620 PUT 12
630 GRAPH
640 ON BREAK GOTO 1630
```

COMMAND



```
650 CALL"RESOLUTION",1,4
660 DIM A(200),B(200),C(200),X(200),Y(200)
670 P$="PLOT":R$="RDOUT":S$="STPLOT":D$="DEFCHAR":L$="LINE"
680 CALL D$,1,0,0,0,32,32,216,32,32
690 CALL D$,2,24,60,126,255,255,126,60,24
700 CALL D$,3,0,0,0,0,0,60,126,255
710 CALL D$,4,0,0,16,56,124,56,16,0
720 CALL D$,5,0,16,124,124,254,124,124,16
730 CALL D$,6,0,0,0,0,0,85,127,127
740 CALL D$,7,0,0,0,0,0,64,64,160
750 C$=CHR$(1):Z$=CHR$(6)
760 E$(0)=CHR$(4):E$(1)=CHR$(5):E$(2)=CHR$(6)
770 D$=CHR$(3):S=1:G$=CHR$(7)
780 Q=0:V=0
790 E$=CHR$(2)
800 FOR I=1 TO 3
810 D(I)=10:E(I)=1
820 PLOT 5+33*(I-1),0,STR$(10)
830 NEXT I
840 E(4)=1
850 DATA 12,36,68,77,100,132,142
860 FOR I=1 TO 7
870 READ F(I):NEXT I
880 L=5
890 FOR S=1 TO 10
900 IF S<>1 THEN GOSUB 1260:GOSUB 1530
910 CALL"RESOLUTION",1,4
920 A$="ATTACK WAVE"+STR$(INT((L-5)/5+1))
930 L=L+5:NI=L
940 GOSUB 1050
950 CALL S$,10,40,VARADR(A$),-14
960 GOSUB 1150
970 CALL S$,10,40,VARADR(A$),-14
980 I=1:X=80:Y=40:J=0
990 FF=1
1000 CALL S$,X,Y,VARADR(C$),-6
1010 GOTO 70
1020 IF S<10 THEN NEXT S
1030 S=10:GOTO 900
1040 REM PLOT GROUND
1050 CALL "RESOLUTION",1,4
1060 CALL "FILL",0,0,160,5,4
1070 FOR I=10 TO 140 STEP 65
1080 CALL S$,I,6,VARADR(D$),4
1090 NEXT I
1100 FOR I=1 TO 4
1110 IF E(I)=1 THEN CALL S$,I*32,6,VARADR(Z$),1
1120 NEXT I
1130 RETURN
1140 REM SET UP ALIENS
1150 FOR I=1 TO NI
1160 X(I)=10+140*RND(1):Y(I)=96+RND(1)*10
1170 X=F(INT(RND(1)*7)+1)+RND(1)*4-2
1180 IF RND(1)>.5 THEN X=5+150*RND(1)
1190 D=80-5*S+RND(1)*10-5
1200 A(I)=(X-X(I))/D
1210 B(I)=(Y(I)-5)/D
1220 C(I)=1
1230 NEXT I
1240 RETURN
1250 REM FINISHED ATTACK WAVE
1260 FOR X=1 TO 4
1270 CALL R$,X*32+3,7,VARADR(Q)
1280 IF Q=1 THEN E(X)=1 ELSE E(X)=0
1290 NEXT X
1300 GRAPH:CALL "FILL",0,0,160,96,2:PLOT 0,57,STR$(V)
1310 A$="BONUS"
1320 CALL S$,55,80,VARADR(A$),15
1330 FOR Y=1 TO 3
1340 IF D(Y)=0 GOTO 1400
1350 FOR X=1 TO D(Y)
1360 V=V+10:PLOT 0,57,STR$(V)
1370 CALL S$,15+X*6,30+Y*8,VARADR(G$),6
1380 FOR T=1 TO 100:NEXT T
1390 NEXT X
1400 NEXT Y
1410 T=0
1420 FOR I=1 TO 4
1430 IF E(I)=0 GOTO 1480
1440 CALL S$,I*16,30,VARADR(Z$),1
1450 FOR W=1 TO 100:NEXT W
1460 V=V+50:PLOT 0,57,STR$(V)
1470 T=1
1480 NEXT I
1490 IF T=0 GOTO 1580
1500 FOR T=1 TO 1000:NEXT T
1510 RETURN
1520 REM SET UP MISSILE BASES
1530 FOR I=1 TO 3
1540 D(I)=10:PLOT 5+33*(I-1),0,STR$(10)
1550 NEXT I
1560 RETURN
1570 REM THE END
1580 CALL "FILL",0,0,160,96,4
1590 A$="THE END"
1600 CALL"CHARSIZE",1,2
1610 CALL "STPLOT",50,40,VARADR(A$),15
1620 PRINT "          YOU SCORED";V
1630 TEXT
1640 END
```

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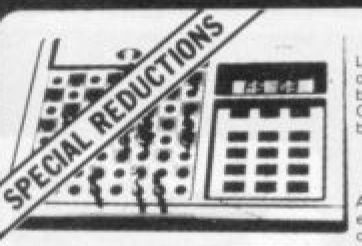
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To win you have to destroy all the security robots. The game can be made harder — should you feel the need — by increasing the number of robot chasers in line 30.

On the model III TRS-80 there is a small character which can be used to represent the player. As the model I and video genie do not have this character line 60 should be changed to show the player as a '*'. The instructions should be changed accordingly



HIGH SE

```
10 CLEAR200
20 LL=64:REM width of screen
30 NR=7:DIMRR(NR):REM number of robots
40 NH=4:MH=3:DIMHH(NH+MH):REM number of hazards
50 MS=2000:REM maximum score
60 PG=253:REM Players graphic,change to 42 for model 1 & Video Genie
70 TC=15488:SP=15360:TT$=STRING$(42,191)
80 REM TI= Time  EC= Robots Remaining MM$= Message
90 REM ME= Players Position RR(n)= Robot n's Position
100 REM HH(n)= Hazard n
110 TI=0:EC=NR:CLS:PRINT@20,"High Security
You are within the grounds of a top secret resarch centre and
there are ";NR;" security robots trying to destroy you.
You are the small man , the robots are 'O' and the '#'s are
dangerously radioactive places
120 PRINT"Your only chance of survival is to maneuver the robots
into the '#'s.Your score will start at ";MS;" points and will
decrease with time."
130 PRINT"If you are caught or destroyed your score will become zero.
Use the arrow keys to move."
```

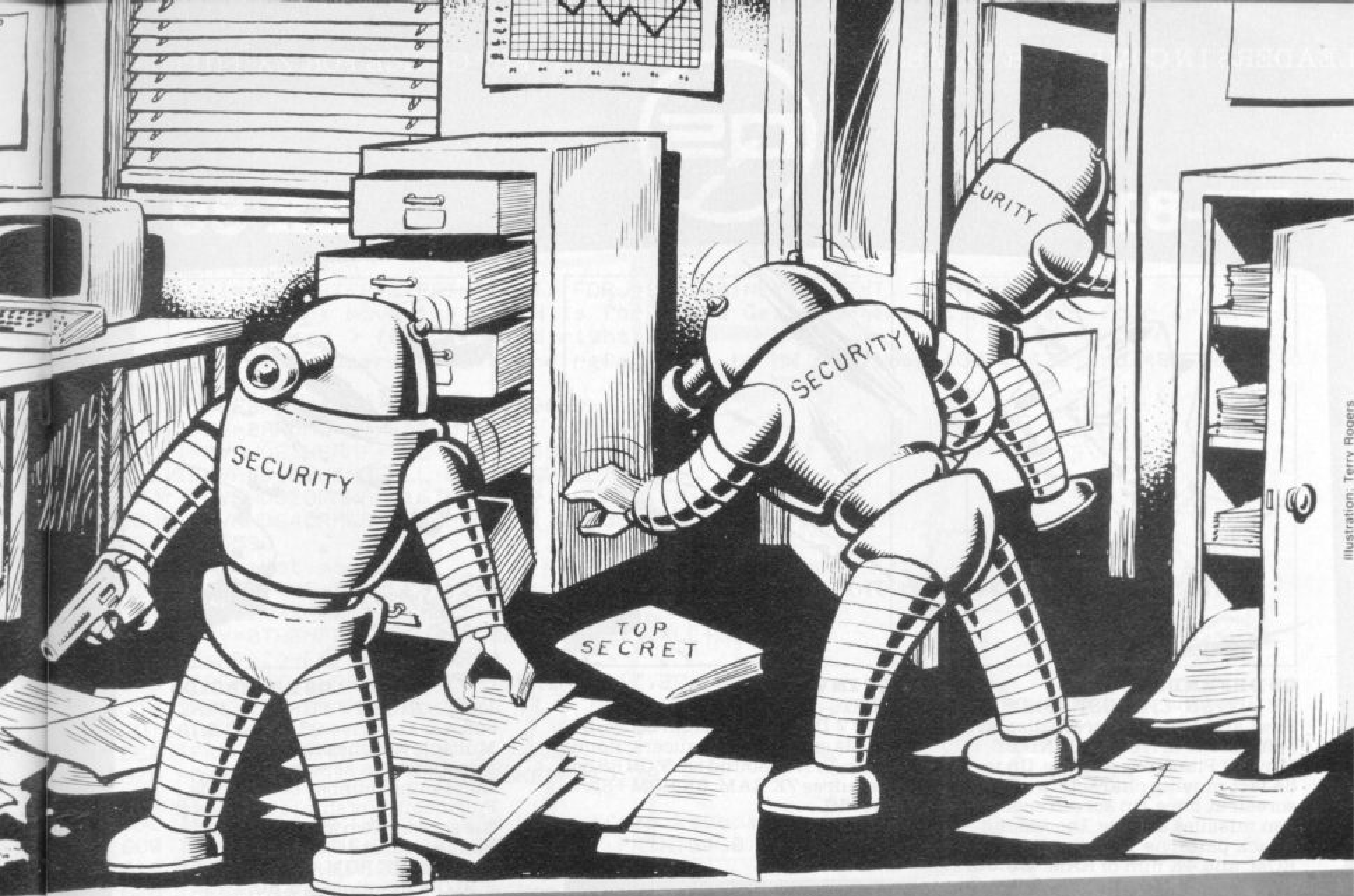


Illustration: Terry Rogers

CURITY

RUNS ON A TRS-80 IN 48K

```
140 PRINT@896,"Press any key to continue.";
150 Z$=INKEY$:IFZ$=""THEN150ELSE250
160 MD=ME+MF:MC=PEEK(MD)
170 IFMC=32THENPOKEME,32:POKEMD,PG:ME=MD:RETURN
180 IFMC=191THENPOKEME,32:POKEMD,43:GOTO640
190 IFMC=79THENPOKEME,32:POKEMD,43:GOTO650
200 IFMC=35THENPOKEME,32:POKEMD,43:GOTO660
210 POKEME,32:POKEMD,PG:ME=MD:RETURN
220 RN=RND(40)+RND(10)*LL+TC
230 IFPEEK(RN)<>32THEN220ELSERETURN
240 REM set up screen for game
250 CLS:PRINT@20,"High Security";                              PRINT@302,TI;:SC=MS
260 PRINT@128,TT$;:PRINT@832,TT$;:PRINT@238,"Time Used";
270 PRINT@366,"Score";:PRINT@430,SC;:PRINT@558,"High Scores";:IFHS(1)=0THENPRINT
@622,"None Yet !";:GOTO300
280 FORK=1TO5:PRINT@558+LL*K,HS$(K);:IFHS(K)>0THENPRINTHS(K);
290 NEXTK
300 PRINT@896,"Robots Remaining =";:PRINT@917,EC;
310 FORI=1TO10:POKETC+LL*I,191:POKETC+LL*I+41,191:NEXT
```

BY DAVID JONES

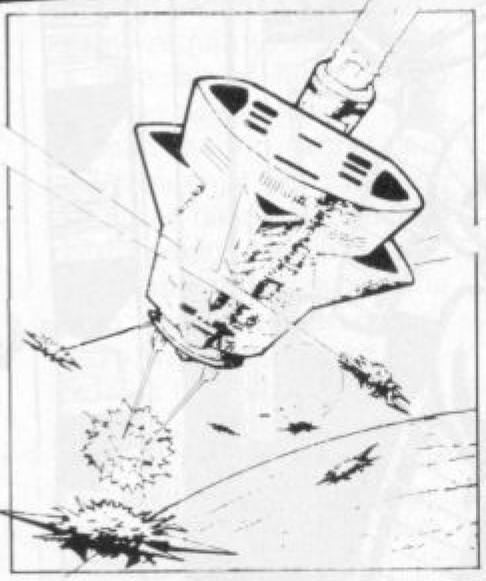
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ZX-81

ZX-80







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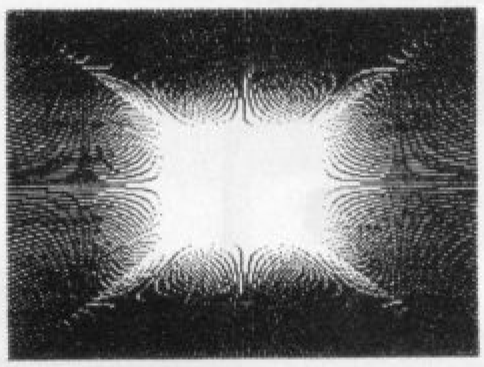
QS ASTEROIDS
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Software to drive QS SOUND BD. Multiple missiles firing in 8 directions. On screen scoring. Increasing number of asteroids. Full mobility of ship to all areas of the screen. Two asteroid sizes. Bonus ship at 10,000 points. Requires 8K ROM, 4K min of RAM + SLOW function. **£5.50.**

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A programmable sound effects board using the AY-3-8910. 3 TONES; 1 NOISE; ENVELOPE SHAPER: + TWO 8 BIT I/O PORTS. Easily programmable from BASIC, the AY chip does most of the work leaving your computer free for other things. Signal O/P via 3.5 mm Jack socket Ports O/P via a 16 pin I.C. Socket. **£26.00.**

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A programmable character generator giving – 128 SEPARATELY PROGRAMMABLE CHARACTERS. ON/OFF SWITCH. 1K ON BOARD RAM. Enables creation and display of your own characters to screen or printer. Demo cassette of fast machine code operation routines and lower case alphabet included. See below for ZX PRINTER listing. **£26.00.**

QS - LOWER CASE

abcdefghijklmnopqrstuvwxyz



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A Hi-res graphics board giving – 256×192 PIXELS. 6K ON BD. RAM. SOFTWARE SELECT/DESELECT. MIXED TEXT AND GRAPHICS. 2K ON BOARD ROM. Resident fast machine code graphics software (in ROM) provides the following HI-RES Commands. – MOVE x, y; PLOT x, y; DRAW x, y; BOX x, y; UP; DOWN; LEFT; RIGHT; PRINT A$; SCROLL; BLACK; WHITE CLEAR COPY. See above for ZX PRINTER listings using COPY. **£85.00.**

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An extremely reliable static RAM Bd. which combines with the computer's memory to give 4K total. Plugs direct in to the rear port on your ZX Computer. **£15.00.**

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A reliable expansion system allowing a total of any RAM pack plus two other plug in boards to be in use at once. On board 5V regulator drives all external boards. Fitted with two 23 way double sided edge connectors. Connector is 2×23 way edge conns soldered back to back. Expansion can operate in two ways – (1) COMPUTER ↔ CONNECTOR ↔ Any QS add on bd. (but no extra RAM pack). (2) COMPUTER ↔ CONNECTOR ↔ MOTHER BD ↔ ANY RAM PACK. (2 bds to fit in mother bd.) Mother board **£12.00** Connector **£4.00.**

● STOP PRESS ● STOP PRESS ● STOP PRESS ●

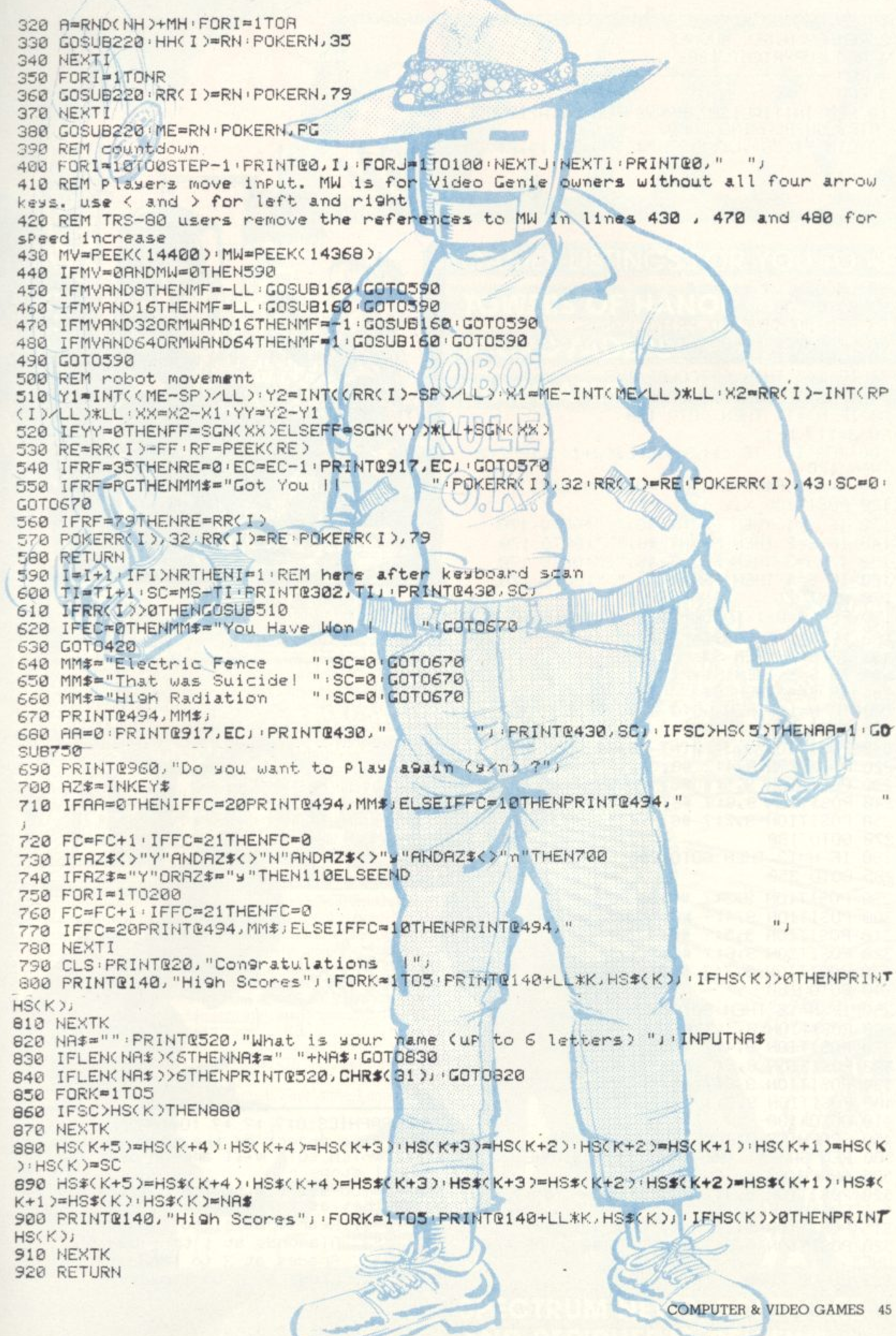
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Please state Type of machine, Which ROM, Memory size, when ordering.




```
320 A=RND(NH)+MH:FORI=1TOA
330 GOSUB220:HH(I)=RN:POKERN,35
340 NEXTI
350 FORI=1TONR
360 GOSUB220:RR(I)=RN:POKERN,79
370 NEXTI
380 GOSUB220:ME=RN:POKERN,PG
390 REM countdown
400 FORI=10TO0STEP-1:PRINT@0,I;:FORJ=1TO100:NEXTJ:NEXTI:PRINT@0,"  ";
410 REM Players move input. MW is for Video Genie owners without all four arrow
keys. use < and > for left and right
420 REM TRS-80 users remove the references to MW in lines 430 , 470 and 480 for
speed increase
430 MV=PEEK(14400):MW=PEEK(14368)
440 IFMV=0ANDMW=0THEN590
450 IFMVAND8THENMF=-LL:GOSUB160:GOTO590
460 IFMVAND16THENMF=LL:GOSUB160:GOTO590
470 IFMVAND32ORMWAND16THENMF=-1:GOSUB160:GOTO590
480 IFMVAND64ORMWAND64THENMF=1:GOSUB160:GOTO590
490 GOTO590
500 REM robot movement
510 Y1=INT((ME-SP)/LL):Y2=INT((RR(I)-SP)/LL):X1=ME-INT(ME/LL)*LL:X2=RR(I)-INT(RP
(I)/LL)*LL:XX=X2-X1:YY=Y2-Y1
520 IFYY=0THENFF=SGN(XX)ELSEFF=SGN(YY)*LL+SGN(XX)
530 RE=RR(I)-FF:RF=PEEK(RE)
540 IFRF=35THENRE=0:EC=EC-1:PRINT@917,EC;:GOTO570
550 IFRF=PGTHENMM$="Got You !!          ":POKERR(I),32:RR(I)=RE:POKERR(I),43:SC=0:
GOTO670
560 IFRF=79THENRE=RR(I)
570 POKERR(I),32:RR(I)=RE:POKERR(I),79
580 RETURN
590 I=I+1:IFI>NRTHENI=1:REM here after keyboard scan
600 TI=TI+1:SC=MS-TI:PRINT@302,TI;:PRINT@430,SC;
610 IFRR(I)>0THENGOSUB510
620 IFEC=0THENMM$="You Have Won !     ":GOTO670
630 GOTO420
640 MM$="Electric Fence     ":SC=0:GOTO670
650 MM$="That was Suicide! ":SC=0:GOTO670
660 MM$="High Radiation     ":SC=0:GOTO670
670 PRINT@494,MM$;
680 AA=0:PRINT@917,EC;:PRINT@430,"          ";:PRINT@430,SC;:IFSC>HS(5)THENAA=1:GO
SUB750
690 PRINT@960,"Do you want to play again (y/n) ?";
700 AZ$=INKEY$
710 IFAA=0THENIFFC=20PRINT@494,MM$;ELSEIFFC=10THENPRINT@494,"                  "
;
720 FC=FC+1:IFFC=21THENFC=0
730 IFAZ$<>"Y"ANDAZ$<>"N"ANDAZ$<>"y"ANDAZ$<>"n"THEN700
740 IFAZ$="Y"ORAZ$="y"THEN110ELSEEND
750 FORI=1TO200
760 FC=FC+1:IFFC=21THENFC=0
770 IFFC=20PRINT@494,MM$;ELSEIFFC=10THENPRINT@494,"                  ";
780 NEXTI
790 CLS:PRINT@20,"Congratulations  !";
800 PRINT@140,"High Scores";:FORK=1TO5:PRINT@140+LL*K,HS$(K);:IFHS(K)>0THENPRINT
HS(K);
810 NEXTK
820 NA$="":PRINT@520,"What is your name (up to 6 letters) ";:INPUTNA$
830 IFLEN(NA$)<6THENNA$=" "+NA$:GOTO830
840 IFLEN(NA$)>6THENPRINT@520,CHR$(31);:GOTO820
850 FORK=1TO5
860 IFSC>HS(K)THEN880
870 NEXTK
880 HS(K+5)=HS(K+4):HS(K+4)=HS(K+3):HS(K+3)=HS(K+2):HS(K+2)=HS(K+1):HS(K+1)=HS(K
):HS(K)=SC
890 HS$(K+5)=HS$(K+4):HS$(K+4)=HS$(K+3):HS$(K+3)=HS$(K+2):HS$(K+2)=HS$(K+1):HS$(
K+1)=HS$(K):HS$(K)=NA$
900 PRINT@140,"High Scores";:FORK=1TO5:PRINT@140+LL*K,HS$(K);:IFHS(K)>0THENPRINT
HS(K);
910 NEXTK
920 RETURN
```

Casino

```
1 REM CASINO ROYALE
2 REM BY NIGEL HUGHES
3 REM COPYRIGHT 1982
4 REM ------------------------
5 REM
10 REM INITIALISE ARRAYS FOR LOCATIONSOF
 PIPS ON PLAYING CARDS
20 DIM P$(36),L$(110),M$(55),S$(1),A$(20

30 P$="

   "
40 L$="
                    "
50 M$="
                    "
60 L$(LEN(L$)+1)=M$
63 GOTO 500
65 REM ROUTINE TO PRINT CARDS
66 GRAPHICS 2+16:SETCOLOR 4,0,6:SETCOLOR
 0,0,6:POKE 756,226
72 IF S<3 THEN SETCOLOR 1,3,3
74 IF S>2 THEN SETCOLOR 1,0,0
80 IF N>=11 THEN GOTO 190
90 J=11*(N-1)
100 FOR I=1 TO 11:Z=ASC(L$(J+I)):IF Z=0
THEN 170
110 X=ASC(P$(2*Z-1)):Y=ASC(P$(2*Z))
120 POSITION X,Y
130 IF S=1 THEN PRINT #6;" ":GOTO 170
140 IF S=2 THEN PRINT #6;"`":GOTO 170
150 IF S=3 THEN PRINT #6;"{":GOTO 170
160 IF S=4 THEN PRINT #6;" ":GOTO 170
170 NEXT I
180 FOR Q=Q+1 TO 500:NEXT Q:Q=0:GOTO 450
190 IF S=1 THEN S$=" "
192 IF S=2 THEN S$="`"
194 IF S=3 THEN S$="{"
196 IF S=4 THEN S$=" "
200 IF N=11 THEN GOTO 210
205 GOTO 280
210 POSITION 9,3:PRINT #6;S$
220 POSITION 9,4:? #6;"___"
230 POSITION 9,5:? #6;" ! "
240 POSITION 9,6:? #6;" ! "
250 POSITION 9,7:? #6;"\/ "
270 GOTO 180
280 IF N=12 THEN GOTO 290
285 GOTO 350
290 POSITION 9,3:? #6;S$
300 POSITION 9,4:? #6;"/‾\"
310 POSITION 9,5:? #6;"!  !"
320 POSITION 9,6:? #6;"\_/"
330 POSITION 9,7:? #6;" ‾\"
340 GOTO 180
350 IF N=13 THEN GOTO 360
360 POSITION 9,3:? #6;S$
370 POSITION 9,4:? #6;"| /"
380 POSITION 9,5:? #6;"|/ "
390 POSITION 9,6:? #6;"|\ "
400 POSITION 9,7:? #6;"! \"
410 GOTO 180
450 GRAPHICS 0:POKE 752,1:RETURN
500 REM GAME#1,THE WHEEL OF FORTUNE
505 GRAPHICS 2+16
510 POSITION 5,4:? #6;"Welcome To":? #6;
"   Casino Royale"
515 POSITION 5,7:? #6;"GAME NO 1"
520 POSITION 0,8:? #6;"THE WHEEL OF FORT
UNE"
525 GOSUB 7000
```

Illustrations: Jon Davis



We've been looking for another challenge for all you card-sharps out there. And we think we've found one in Casino Royale, written by Nigel Hughes. We'll let him describe his program.

"Ever since discovering Dealer X5 in David Ahl's book of More Basic Computer Games, I had been interested in writing a similar game program, but with colour graphics and sound.

The appearance of Changing Hearts in **Computer and Video Games** gave me the clue to printing patterns of Hearts on the screen and I soon had a subroutine written to print the various patterns of Hearts, Diamonds, Clubs and Spades to be found on playing cards.

The tricky stuff for putting patterns of pips in the right places is to be found in lines 30 to 60 and 100 to 170 of the listing. The patterns on playing cards can be arranged in a 3 column by 6 row array of boxes. The last row is only used for the pattern of the ten.

The boxes are labelled 1 to 18. The box numbers, in equivalent ASC character form, in which the pips are to go for cards 1 to 10 inclusive are stored in string L$. L$ contains 10 substrings, each of 11 characters, the last always being the equivalent of zero. Only the last substring is full, the rest being padded out with zeros.

You cannot fill a string directly in Atari Basic if the string is longer than a logical line — about 90 characters. Thus the final string L$, which contains 110 characters, is put together by concatenating — chaining together — two substrings L$ and M$.

The strings L$ and M$ on lines 40 and 50 must be typed using CONTROL Graphics characters obtained with the following keys:

L$ = "H , , , , , , , , , , BN , , , , , , , , , BHN , , , , , , , , ACMO , , , , , , ACHMO , , , , , ,"

M$ = "ACGIMO , , , , , ACEGIMO , , , , ACEGIKMO , , , ACDFHJLMO , , ACEGIJLNPR ,"

In Casino Royale, the variable N selects the value of card to be

```
530 GRAPHICS 0:? :? :? :O=100
540 ? "The object of the game is to gues
s":? "which suit will appear when the":?
 "wheel stops."
550 ? "You start with 100 Dollars.":? "Y
ou may bet as follows:-"
560 ? "1. Hearts at 11 to 1 odds"
570 ? "2. Diamonds at 1 to 1 odds"
580 ? "3. Spades at 3 to 1 odds"
590 ? "4. Clubs at 3 to 1 odds"
```

Royal

RUNS ON AN ATARI 400/800

BY NIGEL HUGHES



printed — 11 for Jack, 12 for Queen and 13 for King. The variable S selects the Suits — 1 = Hearts, 2 = Diamonds, 3 = Spades, 4 = Clubs. When cards are wanted for any game, GOSUB 65 enters the printing routine on lines 65 to 450. The routine uses N to select the right pattern of locations from L$ in lines 90 and 100. P$ is then used to convert the pattern on the card to actual GRAPHICS 2+16 screen locations.

As with L$, P$ uses ASC equivalent characters to store numbers. P$ must be typed using CONTROL graphics characters as follows: P$ = "ICJCKCIDJDKDIEJEKEIFJFKFIGJGKGIHJHKH"

Jacks, Queens and Kings were too tough for me to draw, so lines 220 to 250, 290 to 330 and 360 to 400 print graphics characters which represent a big J, Q or K respectively. My printer has left the inevitable gaps in the listing, but as these are not critical to the running of the program, I have sketched in the symbols. To get the Heart, Diamond, Spade and Club symbols printed, the Control Graphics characters comma, full stop, semi-colon and P respectively should be typed between the quote marks on lines 190 to 196 and 220 to 250.

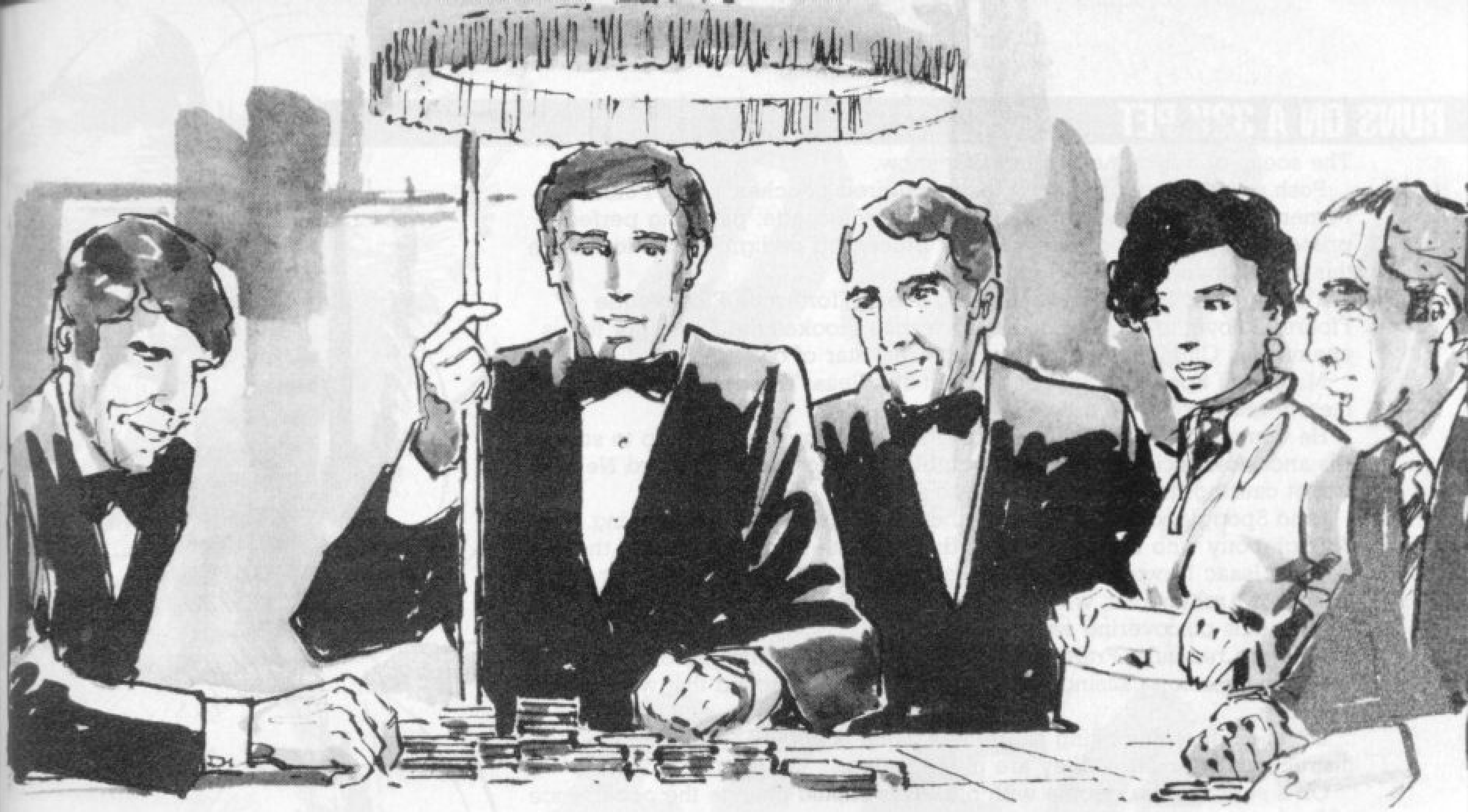
When printing the various titles for the games themselves, we can easily add variety to the colours by typing the titles in the program using a mixture of upper and lower case letters as shown.

Each game in the casino is preceded by music. GOSUB 7000 is used only for the introductory music. Data lines are used to select the pitch and length of each note.

The program contains a fair number of blunder collection routines, but pressing RETURN on its own when a letter or number input is requested will result in an Atari operating system ERROR message. Usually the way out of this is to type CONT and press RETURN, when all will be well."

```
600 ? "WHICH SUIT DO YOU WANT";:INPUT A
610 IF A<1 OR A>4 THEN ? "WRONG SUIT!!":
GOTO 600
620 ? "O.K. HOW MUCH IS THE BET";:INPUT
B8
630 IF B8<1 OR B8>25 THEN ? "YOU BET OVE
R THE HOUSE LIMIT":GOTO 620
640 POKE 752,1:? "O.K. Now that the bet
is in, we will":? "spin the wheel."
650 FOR TIME=TIME+1 TO 300:NEXT TIME:TIM
E=0:GRAPHICS 0:POSITION 2,10:POKE 752,1
660 ? "      THE WHEEL IS SLOWING DOWN"
670 FOR TIME=TIME+1 TO 200:NEXT TIME:TIM
E=0
680 ? "       THE WHEEL IS STOPPING!!"
690 FOR TIME=TIME+1 TO 200:NEXT TIME:TIM
E=0
700 ? "          THE SUIT IS........"
710 FOR TIME=TIME+1 TO 200:NEXT TIME:TIM
E=0
720 Z=INT(RND(1)*10+1):IF Z=1 THEN S=1
730 IF Z=2 OR Z=3 OR Z=4 OR Z=5 THEN S=2
740 IF Z=6 OR Z=7 THEN S=3
750 IF Z=8 OR Z=9 OR Z=10 THEN S=4
760 N=INT(RND(1)*10+1):GOSUB 65
765 IF A=S THEN GOTO 770
767 IF A<>S THEN GOTO 820
770 ON S GOTO 780,790,800,810
780 O=O+(11*B8):POSITION 10,10:? "YOU WI
N ON HEARTS!":GOTO 850
790 O=O+(1*B8):POSITION 10,10:? "YOU WIN
 ON DIAMONDS!":GOTO 850
800 O=O+(3*B8):POSITION 10,10:? "YOU WIN
 ON SPADES!":GOTO 850
810 O=O+(3*B8):POSITION 10,10:? "YOU WIN
 ON CLUBS!":GOTO 850
820 O=O-(1*B8):POSITION 1,10:? "YOU LOSE
. GOOD LUCK ON THE NEXT GAME!!"
850 ? :? "  AT THE END OF THE GAME YOU H
AVE":? "             ";O;" DOLLARS."
860 FOR TIME=TIME+1 TO 500:NEXT TIME:TIM
E=0
870 REM GAME#2, IN BETWEEN
875 GRAPHICS 2+16:POSITION 3,4:? #6;"Cas
ino Royale":POSITION 5,5:? #6;"GAME #2"
890 POSITION 4,7:? #6;"In Between":GOSUB
 8000
900 GRAPHICS 0:? :? "I will deal out fiv
e cards. "
910 ? " If any card is less than a 3 or
":? "greater than a 10, then you lose"
920 ? " You may bet up to 30 dollars.":?
 "Your money will be doubled each time":
? "you are right."
930 ? "  GOOD LUCK!!!":?
940 ? "WHAT IS THE BET";:INPUT A
950 IF A>30 OR A<=0 THEN ? "YOU BET OVER
 THE HOUSE LIMIT!!":GOTO 940
960 T=T+1:N=INT(12*RND(1)+1):S=INT(RND(1
)*4+1):GOSUB 65
970 POSITION 10,10:? "CARD NUMBER ";T;"
IS A ";N:B=B+(2*A)
980 IF N<3 OR N>10 THEN 1030
990 IF T=5 THEN 1050
1000 ? "YOU ARE STILL IN THE GAME.YOU HA
VE ":? "             ";B;" DOLLARS"
1010 ? "        STICK OR TWIST (S OR T)":I
NPUT A$:IF A$(1,1)="T" THEN 960
1020 IF A$(1,1)="S" THEN 1050
1030 O=O-A
1040 ? :? "YOU LOST!! AT THE END OF PART
 TWO":? "        YOU HAVE ";O;" DOLLARS"
1045 FOR TIME=TIME+1 TO 500:NEXT TIME:TI
ME=0:GOTO 1070
1050 ? "YOU WIN!! AT THE END OF PART TWO
":? "          YOU HAVE ";B+O;" DOLLARS":
O=O+B
```

```
1055 FOR TIME=TIME+1 TO 400:NEXT TIME:TI
ME=0
1065 REM GAME#3, BLACKJACK
1070 GRAPHICS 2+16:POSITION 3,5:? #6;"Ca
sino Royale":POSITION 6,6:? #6;"GAME # 3
":POSITION 5,7:? #6;"blackjack"
1080 GOSUB 8000:GRAPHICS 0:? :?
1090 ? " In the game of BLACKJACK, the "
:? "object is to beat the dealer with"
1100 ? "over 17 or 21 or under. You may
bet":? "up to $50. You may stop when you
":? "wish. If you make BLACKJACK"
1105 ? "your money is doubled."
1110 ? "IF THE HOUSE DEALS OUT LESS THAN
 A":? " TOTAL OF 17 IN SIX TRIES, YOU WI
LL":? " KEEP THE MONEY YOU BET."
1120 ? "       GOOD LUCK!!!!":?
1130 DD=0:PP=0:? "THE DEALER WILL GET HI
S CARDS FIRST.":? "HIT RETURN TO START T
HE DEAL"
1132 INPUT A$:IF A$="" THEN 1140
1135 IF A$<>"" THEN GOTO 1130
1140 C=0:C3=0
1150 ? "HERE I GO!":FOR TIME=TIME+1 TO 2
00:NEXT TIME:TIME=0
1160 N=INT(RND(1)*13+1):S=INT(4*RND(1)+1
)
1170 DD=N+DD:GOSUB 65
1180 POSITION 10,12:? "THE CARD IS A ";N
:C=C+1
1190 POSITION 13,14:? "SO FAR:";DD:FOR T
IME=TIME+1 TO 200:NEXT TIME:TIME=0:IF C=
6 THEN 1250
1200 IF DD<17 THEN 1160
1210 IF DD>21 THEN 1310
1220 IF DD=21 THEN 1280
1230 IF DD<21 THEN 1270
1240 IF DD>=17 THEN 1270
1250 IF DD<17 THEN 1290
1260 IF DD>=17 THEN 1200
1270 ? " I STICK. THE TOTAL FOR ME IS ";
DD:? "              NOW YOU GO":? :GOTO 1330
1280 ? "              I GOT BLACKJACK!!":? :GO
TO 1330
1290 ? " THE HOUSE DEALT OUT LESS THAN 1
7.":? "NOW YOU MUST TRY TO BEAT ME"
1300 ? :GOTO 1330
1310 ? "  BUST!!!!!. YOU WIN THE GREATES
T":? "AMOUNT ALLOWED TO BE BET BY THE HO
USE":GOTO 1560
1320 GOTO 1460
1330 ? "              WHAT IS THE BET";:INPUT
 A
1340 IF A>O THEN 1380
1350 IF A>50 OR A<=0 THEN 1370
1360 IF A<=50 THEN 1390
1370 ? "*** YOU BET OVER THE HOUSE LIMIT
 ***":GOTO 1330
1380 ? "*** YOU BET MORE THAN YOU HAVE *
**":GOTO 1330
1390 N=INT(13*RND(1)+1):S=INT(4*RND(1)+1
):GOSUB 65:POSITION 10,10:? "YOUR CARD I
S A ";N:C3=C3+1
1400 PP=N+PP:? "SO FAR THE TOTAL FOR YOU
 IS ";PP:IF C3=6 THEN 1490
1410 IF PP>21 THEN 1520
1420 ? "STICK OR TWIST (S OR T)";:INPUT
A$
1430 IF A$(1,1)="S" THEN 1450
1440 IF A$(1,1)="T" THEN 1390
1450 IF PP=DD THEN 1500
1460 IF PP<DD THEN 1520
1470 IF PP=21 THEN 1510
1480 IF DD<PP THEN 1530
1490 IF PP<17 THEN 1540
1500 ? "WE ARE THE SAME SO WE WILL PLAY
AGAIN":GOTO 1130
1510 O=O+(2*A):? "YOU BEAT THE DEALER WI
TH BLACKJACK!":GOTO 1570
1520 O=O-(1*A):? "THE DEALER BEAT YOU.YO
U LOSE":GOTO 1570
1530 O=O+(1*A):? "THE DEALER LOST. YOU W
IN!":GOTO 1570
1540 O=O+(1*A):? "THE HOUSE DEALT OUT LE
SS THAN 17 IN":? "SIX TRIES."
1550 ? "YOU GET THE MONEY YOU BET.":GOTO
 1570
1560 O=O+50:? "CONGRATULATIONS ON YOUR G
OOD LUCK! ":GOTO 1570
1570 ? "AT THE END OF PART THREE YOU HAV
E":? O;" DOLLARS":FOR TIME=TIME+1 TO 350
:NEXT TIME:TIME=0
1580 IF O<=0 THEN 1945
1785 REM GAME #4, CLOCK CHIMING
1790 GRAPHICS 2+16:POSITION 3,5:? #6;"Ca
sino Royale":POSITION 6,6:? #6;"Game #4"
:POSITION 3,7:? #6;"CLOCK CHIMING"
1795 GOSUB 8000
1796 GRAPHICS 0:? :? :? " The Dealer wil
l deal 13 cards. If":? "the first is an
ace or the second a"
1797 ? "two or the third a three and so
on":? "then you win. If no cards come up
":? "right, the dealer wins."
1798 ? "  YOU MAY BET UP TO 50 DOLLARS"
1800 C=0:DIM NUMBER$(65):NUMBER$="ONE  T
WO  THREEFOUR FIVE SIX  SEVENEIGHTNINE T
EN  JACK QUEENKING "
1805 ? "     HOW MUCH IS THE BET"
1810 INPUT B8
1820 IF B8>50 OR B8<=0 THEN ? :? "*** YO
U BET OVER THE HOUSE LIMIT ***":GOTO 181
0
1830 IF B8>O THEN ? "*** YOU BET MORE TH
AN YOU HAVE ***":GOTO 1810
1840 ? :? " O.K. NOW I WILL DEAL THE CAR
DS"
1845 FOR TIME=TIME+1 TO 200:NEXT TIME:TI
ME=0
1850 C=C+1:IF C=14 THEN 1920
1860 N=INT(13*RND(1)+1):S=INT(4*RND(1)+1
)
1870 GRAPHICS 2+16:POSITION 8,5:? #6;NUM
BER$((5*C)-4,5*C)
1880 FOR TIME=TIME+1 TO 150:NEXT TIME:TI
ME=0
1890 GOSUB 65
1900 IF N<>C THEN 1850
1910 IF N=C THEN O=O+B8:GRAPHICS 0:POSIT
ION 16,10:? "YOU WIN!":GOTO 1930
1920 GRAPHICS 0:POSITION 16,10:? "YOU LO
SE!"
1930 POSITION 3,11:? "AT THE END OF THE
GAME, YOU HAVE":POSITION 16,12:? O;" DOL
LARS"
1935 FOR TIME=TIME+1 TO 200:NEXT TIME:TI
ME=0
1940 IF O>200 THEN ? "YOU HAVE OVER 200
DOLLARS AND YOU":? "CAN NOW PLAY THE SPE
CIAL BONUS GAME.":GOTO 1955
1945 IF O<200 THEN GRAPHICS 1+16:POSITIO
N 0,9:? #6;"Thanks for the game"
1950 ? #6;"    BETTER LUCK":? #6;"      N
EXT TIME":GOTO 1945
1955 FOR TIME=TIME+1 TO 200:NEXT TIME:TI
ME=0
2575 REM GAME #4, OVER OR UNDER
2580 GRAPHICS 2+16:POSITION 3,4:? #6;"Ca
```



```
sino Royale":POSITION 6,5:? #6;"GAME # 5
"
2585 POSITION 3,6:? #6;"over or under"
2590 SOUND 1,145,10,4:SOUND 2,122,10,4:S
OUND 3,97,10,4
2595 GOSUB 8000:SOUND 1,0,0,0:SOUND 2,0,
0,0:SOUND 3,0,0,0:GRAPHICS 0
2600 ? :? :? " In the game of OVER OR UN
DER, the":? "dealer deals one card to st
art."
2610 ? "He then asks you if you want to
":? "change the first card. After that,"
:? "you have to guess whether"
2620 ? "each card dealt will be over or"
:? "under the last card.":? " For each c
orrect guess,your bet"
2630 ? "is doubled.You may bet up to $75
!"
2640 ? :? "            HOW MUCH IS THE BET?"
2650 INPUT B8:IF B8>75 THEN PRINT "***YO
U BET OVER THE HOUSE LIMIT!***":GOTO 264
0
2660 IF B8>O THEN PRINT "***YOU BET MORE
 THAN YOU HAVE GOT***":GOTO 2640
2670 GRAPHICS 0:POSITION 2,10:? "O.K. NO
W I WILL DEAL THE FIRST CARD"
2680 FOR TIME=TIME+1 TO 200:NEXT TIME:TI
ME=0:C=0:F=0:B=0
2690 S=INT(4*RND(1)+1):N=INT(13*RND(1)+1
):GOSUB 65:IF F=1 THEN 2730
2710 GRAPHICS 0:POSITION 2,10:? "DO YOU
WANT TO CHANGE THE FIRST CARD"
2720 INPUT A$:IF A$(1,1)="Y" THEN F=1:GO
TO 2690
2730 IF C<5 THEN GRAPHICS 0:POSITION 9,1
0:? "STICK OR TWIST (S OR T)";
2732 INPUT A$:IF A$(1,1)="S" THEN GOTO 2
780
2734 IF A$(1,1)="T" THEN ? "       OVER
OR UNDER (O OR U)";:INPUT A$
2735 IF C=5 THEN GOTO 2780
2740 LAST=N:S=INT(4*RND(1)+1):N=INT(13*R
ND(1)+1):C=C+1:GOSUB 65
2750 IF N>LAST AND A$(1,1)="O" THEN B=B+
(2*B8):GOTO 2730
2760 IF N<LAST AND A$(1,1)="U" THEN B=B+
(2*B8):GOTO 2730
2770 GRAPHICS 0:POSITION 2,10:? "    BAD
LUCK!! YOU BLEW IT!!!!!!!!!"
2780 O=O+B:POSITION 2,11:? "AT THE END O
F THIS GAME YOU HAVE":? O;:? " DOLLARS."
2785 FOR TIME=TIME+1 TO 200:NEXT TIME:TI
ME=0
2800 GOSUB 9000:END
7000 REM INTRODUCTORY MUSIC
7010 READ N,L:IF L=1000 THEN 7050
7020 SOUND 0,N,10,10
7025 SOUND 1,73,10,3
7030 FOR TI=TI+1 TO 10*L:NEXT TI:TI=0
7040 GOTO 7010
7050 SOUND 0,0,0,0
7055 SOUND 1,0,0,0:RETURN
7060 DATA 73,2,65,2,61,2,73,2,65,2,61,6,
65,2,73,2,65,2,61,6,65,2,73,2,61,1,0,1,6
1,3,73,8,0,1000
8000 REM OTHER TUNES
8010 READ N,L:IF L=1000 THEN 8070
8020 SOUND 0,N,10,10:SETCOLOR 4,N,3
8030 FOR TI=TI+1 TO 8*L:NEXT TI:TI=0
8040 GOTO 8010
8050 DATA 122,6,82,2,92,6,0,1,82,3,103,2
,92,6,122,1,0,1,122,2,0,1,122,1,0,1,122,
1,0,1,82,3,103,2,92,6,0,1000
8055 DATA 61,1,0,1,61,3,54,2,48,2,46,2,4
1,2,38,2,36,8,0,1,36,4,48,4,0,1000
8060 DATA 122,2,61,2,65,2,73,2,82,2,92,2
,97,2,109,2,122,4,61,2,73,2,92,2,109,2,6
5,2,82,2,97,2,122,8,0,1000
8065 DATA 73,2,0,2,73,2,0,2,73,2,0,2,73,
4,0,2,73,2,65,2,61,2,54,4,65,2,0,1000
8070 SOUND 0,0,0,0:RETURN
9000 REM -BEEPS +BURBLES +FLASHING LIGHT
S
9010 GRAPHICS 2+16:? #6;:? #6;"  WELL DO
NE YOU'VE":? #6;"      broken":? #6;"
  THE BANK!!!!!"
9020 FOR J=J+1 TO 255
9030 SOUND 0,J,10,8
9040 NEXT J:J=0
9050 SOUND 0,0,0,0
9060 RETURN
```

RUNS ON A 32K PET

The scene of our game is a top dog show.

Posh people's preened puppies, pampered pooches; pugs, Pekinese, Pomeranians (poodles perhaps) proudly promenade, parading perfectly primed postures, providing properly processed pedigrees and lots more things beginning with "P".

The name of the little dog in this game is Ffortescue Ffookes the Ffourth, known to his friends as Ffortescue Ffookes the Fourth, or to his enemies as Chunky. But I digress, the real star of our saga is a flea.

Malcolm J Spogglebotty is a lord among fleas. To say that his blood is merely blue would be a lie.

He comes from a long line of fleas all of whom were well up to scratch. His ancestors include: Trevor Spogglebotty, who got inside Lord Nelson's jacket causing him to reach inside to scratch.

Gino Spogglebotty, who tickled the Mona Lisa as she was posing. Noah Spogglebotty who bit the bird that dropped the apple that fell on the head of Isaac Newton who cried 'Eureka' and fell into the swimming pool on top of Archimedes, who was having trouble with his principal at school, thus discovering water.

Or more recently, Frank Spogglebotty who bit Adam Ant on the recording session causing him to utter the famous sound that we all know and love.

But enough of this biting satire, this game is about — oh, read the instructions yourself — they are in the listing.

On a serious note people with old PETs should change the occurrence of Peek 151 to Peek 515, which will enable you to run the program.

BY PAUL JAY

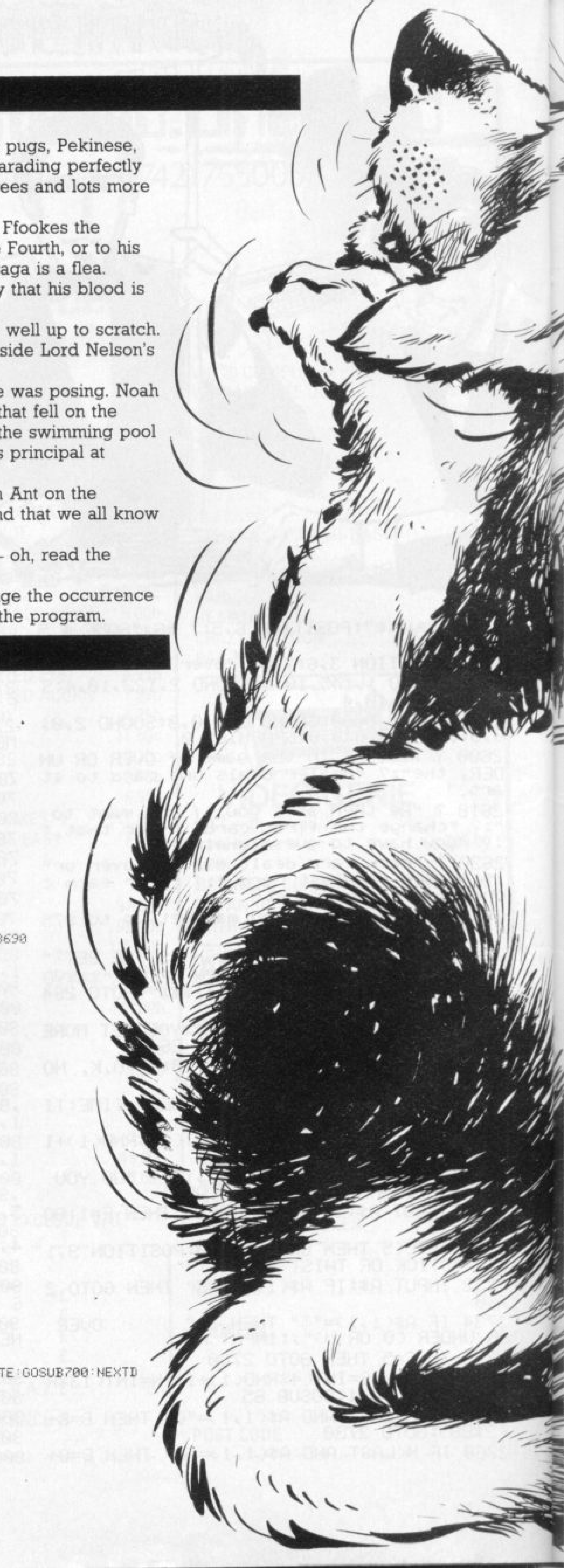


Illustration: Terry Rogers

```
10 DIMN(8,5)
20 FORI=1TO8
30 FORJ=1TO5
40 READN(I,J)
50 NEXTJ:NEXTI
60 REM SETTING UP,AND INSTRUCTIONS
70 QQ=0:C=80:F=720:G=32888:DO=102:BO=72
80 PRINT"□"
90 N$="▶▶▶▶▶▶▶▶▶▶▶▶DOG AND FLEA■":GOSUB690
100 N$="▼▶▶▶▶▶▶▶▶▶▶▶BY PAUL JAY  ":GOSUB690
110 PRINT
120 PRINT"▼THE OBJECT OF THE GAME IS TO"
130 PRINT"▼JUMP ONTO THE BACK OF THE DOG."
140 PRINT"▼EACH TIME YOU TOUCH THE DOG'S BACK"
150 PRINT"▼YOU SCORE ONE BITE."
160 PRINT
170 FORI=1TO1500:NEXTI:N$="YOU ARE A FLEA'π' !!":GOSUB690
180 PRINT
190 PRINT
200 PRINT"TO JUMP RIGHT,USE KEY '6'"
210 PRINT"▼TO JUMP LEFT,USE '4'"
220 PRINT
230 PRINT"YOU HAVE ONE MINUTE TO SCORE."
240 PRINT
250 PRINT"GOOD BITING!!"
260 N$="▼▼▼PRESS ANY KEY TO START":GOSUB690
270 GETA$:IFA$=""THEN270
280 TI$="000000":PRINT"□"
290 A=38*RND(1)+33569
300 FORI=32768TO33728STEP40:POKEI,BO:NEXT
310 FORI=32809TO32847:POKEI,111:NEXT
320 FORI=33649TO33687:POKEI,111:NEXT
330 FORI=32807TO33767STEP40:POKEI,BO:NEXT
340 S=0
350 REM SCORE AND DOG
360 PRINT"■";:GOSUB900
370 PRINT"▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼";
380 PRINT"▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶";
390 A$=""
400 IFTI$>"000100"THEN600
410 B$=""
420 GOSUB700
430 B$=B$+"▒▼◤  , ▼█████"
440 B$=B$+"◥▒◤ ▼█████"
450 B$=B$+"/  \ "
460 B$=B$+"T███████▒▼◤   "
470 B$=B$+"▼█████◥▒  ▼████"
480 B$=B$+"| |  T███████"
490 FORD=1TO16:PRINTB$;:X=INT(9*RND(1)):FORE=1TOX:NEXTE:GOSUB700:NEXTD
500 A$=A$+" \   ◤▄▒▼██████"
510 A$=A$+"  ◥▒◤▼█████"
520 A$=A$+" /  \"
530 A$=A$+"T████    ◤▄▒▼██████"
540 A$=A$+"  ▒◤▼█████"
550 A$=A$+"  | |T████"
```



DOG & FLEA

```
560 FORD=1TO16:PRINTA$;:GOSUB700:NEXTD
570 GOTO360
580 RETURN
590 REM SCORE + NEW GAME OPTION
600 PRINT"▯";"YOU SCORED"S"BITES";
610 IFS>QQTHENQQ=S
620 PRINT" THE TOP SCORE IS "QQ
630 FORI=1TO10:POKE158,0:NEXT
640 INPUT"DO YOU WANT ANOTHER GAME▮▮▮▮▮▮▮";A$
650 IFLEFT$(A$,1)="Y"THEN280
660 IFLEFT$(A$,1)<>"N"THENPRINT"STOP MUCKING ABOUT,ANSWER YES OR NO":GOTO640
670 PRINT"THANKS FOR PLAYING":END
680 REM SLOW WRITER
690 FORW=1TOLEN(N$):PRINTMID$(N$,W,1);:FORV=1TO50:NEXTV,W:RETURN
700 REM FLEA JUMPING
710 A=A-C:IFA<GTHENA=A+F
720 IFPEEK(A)=DOTHENS=S+1:GOSUB900
730 IFPEEK(A)=BOTHENA=A-1
740 IFPEEK(A-1)=BOTHENA=A+1
750 IFPEEK(A1)=DOTHENS=S+1:GOSUB900
760 IFPEEK(A)=DOTHENPOKEA1,32:POKEA,94:GOSUB830:GOSUB970:A1=A:GOTO790
770 IFPEEK(A1)=DOTHENPOKEA1,32:POKEA,94:GOSUB830:GOSUB970:A1=A:GOTO790
780 POKEA1,32:POKEA,94:A1=A
790 P=151:L=PEEK(P):IFL=42THENA=A-1
800 IFL=41THENA=A+1
810 RETURN
820 REM SOUND
830 AA=59467:BB=59466:CC=59464
840 NN=INT( 50*RND(1)+100)
850 POKEAA,16:POKEBB,55:POKECC,NN
860 FORK=1TO50:NEXTK
870 POKECC,0:POKEAA,0
880 RETURN
890 REM SCORE
900 FORI=0TO100STEP10
910 IFS-I>9THEN960
920 POKE32783,130:POKE32784,137:POKE32785,148:POKE32786,133:POKE32787,147
930 POKE32789,(I/10)+48
940 POKE32790,(S-I)+48
950 RETURN
960 NEXTI
970 R=INT(8*RND(1))+1
980 FORI=1TO5
990 POKE33745+I,N(R,I)
1000 NEXTI
1010 FORI=1TO300:NEXTI
1020 FORI=33746TO33750:POKEI,32:NEXTI
1030 RETURN
1040 DATA25,9,16,5,33,23,15,15,6,33
1050 DATA5,5,5,11,33,15,21,3,8,33
1060 DATA13,5,15,23,33,21,18,18,11,33
1070 DATA25,5,12,16,33,1,1,7,8,33
1080 RESTORE
READY.
```

MOONSHUT

RUNS ON A VIC-20 IN 3.5K

BY P. A. ROBERTS

Landing on the rough surface of any planet is difficult enough, but when you've got asteroids whizzing around your craft threatening to do it terminal damage it makes the operation a life and death affair!

Moon Shuttle is a cross between a lunar lander and asteroids game. You have to guide your craft through a maze of deadly asteroids and land safely.

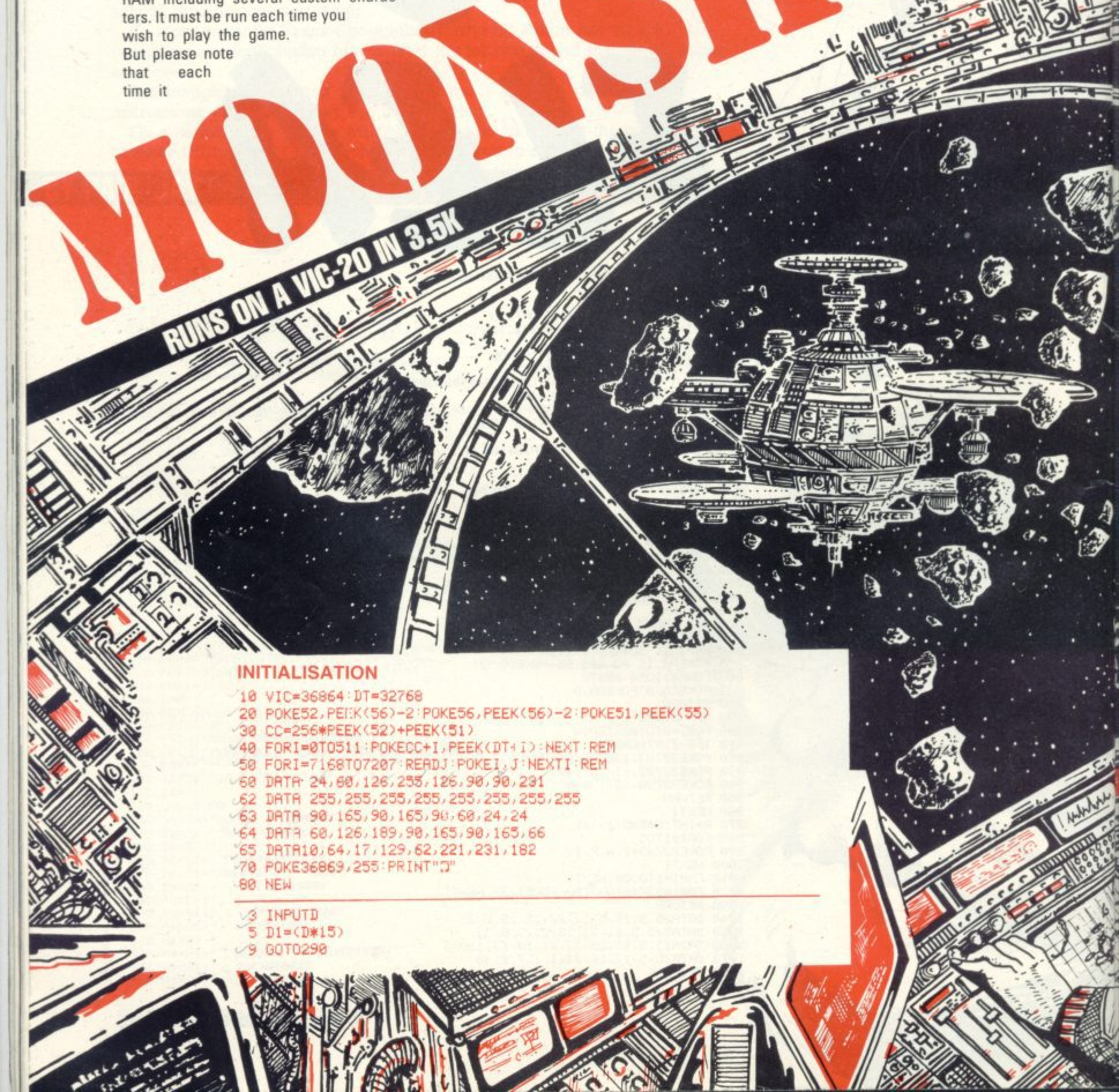
The program is designed for use with a joystick — but it can be played using the Vic's keyboard by making the changes shown below. When the program is run the computer asks you for a number between 1-15 — this decides the difficulty of the game, by deciding the number of asteroids.

By moving the joystick — or pressing any key — you start the game. The spacecraft takes off from the lunar surface and then drifts across the screen. You have to land on one of the blue landing pads — but watch out for those asteroids! You also have to keep an eye on your fuel consumption — don't run out before you land! The difficulty level increases after each successful landing.

IMPORTANT: The program comes in two parts — otherwise it would not fit in 3.5K. The first part is "Initialisation" and sets up a character table in 512 bytes of RAM including several custom characters. It must be run each time you wish to play the game. But please note that each time it is run 512 bytes are sealed off and if it is run more than once during your session with the Vic an out of memory error will result.

Alterations for use without joystick.

On line 410 change the value of J to 197. On line 395 change the 37137 to 197 and the 126 to 64. On line 600 change the 90 to 51. On line 610 change the 94 to 20. On line 620 change 78 to 43. On line 630 change 86 to 28. On line 1040 change 90 to 51. On line 2050 change 94 to 20. On line 3030 change 78 to 43. On line 4030 change 86 to 28. Then use keys: U-up, N-down, J-right, H-left.



INITIALISATION

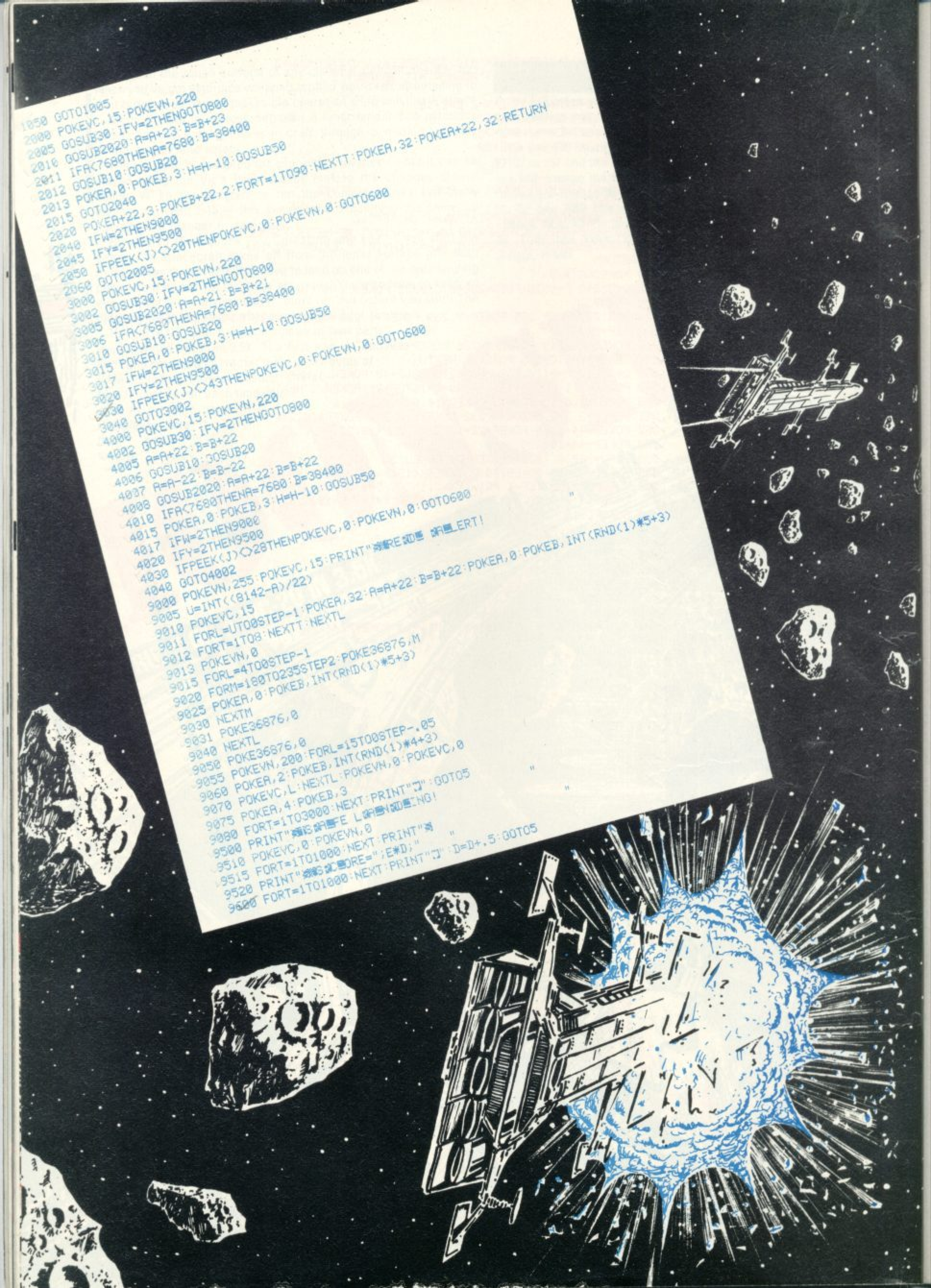
```
10 VIC=36864:DT=32768
20 POKE52,PEEK(56)-2:POKE56,PEEK(56)-2:POKE51,PEEK(55)
30 CC=256*PEEK(52)+PEEK(51)
40 FORI=0TO511:POKECC+I,PEEK(DT+I):NEXT:REM
50 FORI=7168TO7207:READJ:POKEI,J:NEXTI:REM
60 DATA 24,60,126,255,126,90,90,231
62 DATA 255,255,255,255,255,255,255,255
63 DATA 90,165,90,165,90,60,24,24
64 DATA 60,126,189,90,165,90,165,66
65 DATA10,64,17,129,62,221,231,182
70 POKE36869,255:PRINT"J"
80 NEW
```

```
3 INPUTD
5 D1=(D*15)
9 GOTO290
```

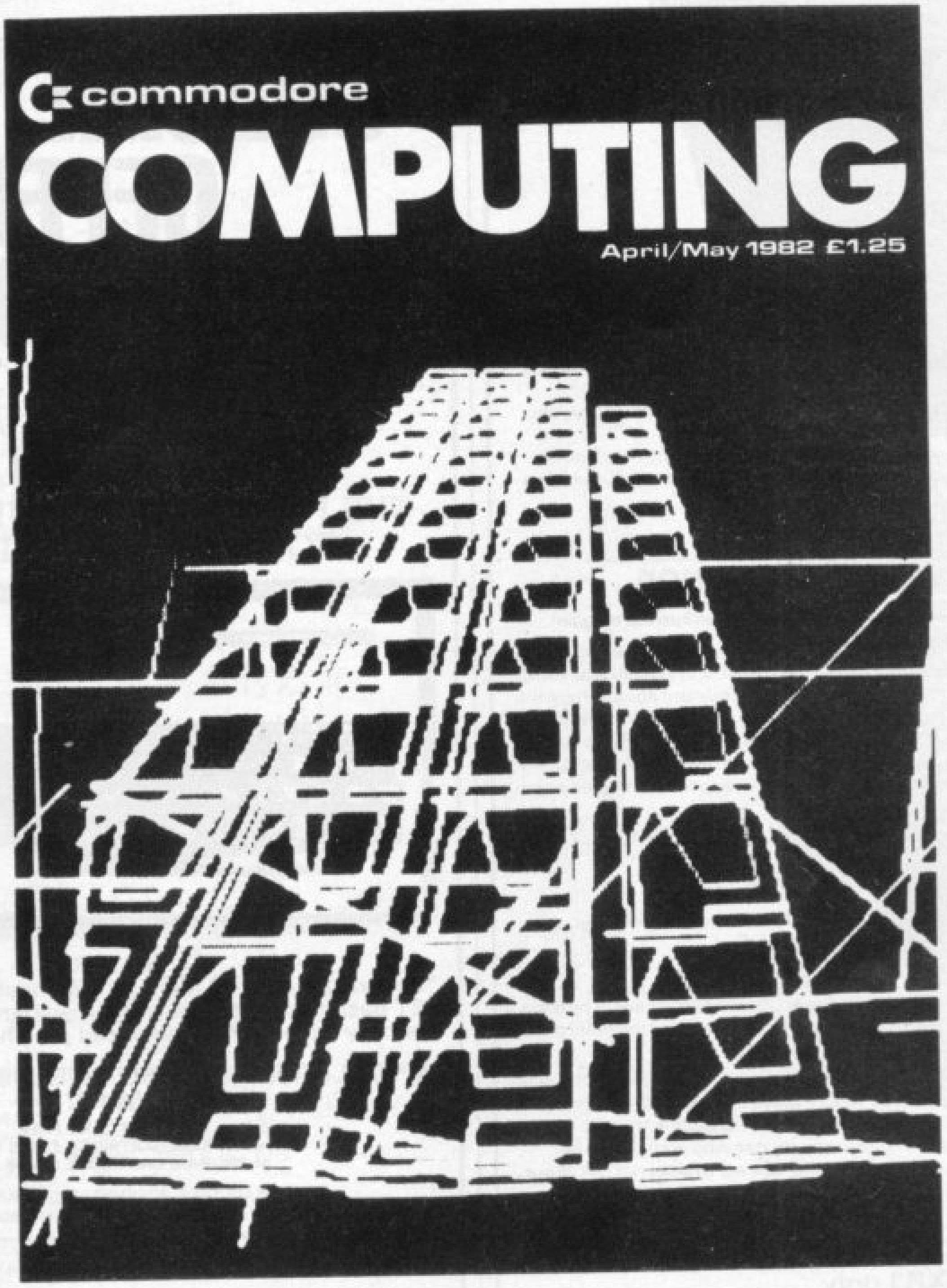


Illustration: Dorian Cross

```
10 IFPEEK(A)<>230ANDPEEK(A)<>32ANDPEEK(A)<>232THENW=2
11 IFPEEK(A)=46THENPRINT"SHIP HIT BADLY!"
12 RETURN
20 IFA=8124ORA=8123THENY=2:E=E+10
21 IFA=8182THENY=2:E=E+60
22 IFA=8130THENY=2:E=E+30
23 IFA=8134THENY=2:E=E+20
24 RETURN
30 Z=Z-1
31 IFZ<=0THENPRINT"OUT OF FUEL!          ":V=2
32 RETURN
50 IFA<7856ANDV<>2THENPRINT"H=";H;"E=";Z
51 IFA>=8054ANDV<>2THENPRINT"H=";H/10;" E-METER FAULTY!":RETURN
52 IFA>=7856ANDV<>2THENPRINT"H=";(H/10);" E/10=";(Z/10)
53 RETURN
290 POKE36879,8
300 Q=38840:P=8120:FORW=38840TO38905:POKEW,1:NEXTW
305 PRINT"J"
310 P=8120:POKEP,239:POKEP+7,239:POKEP+1,228:POKEP+8,228:POKEP+12,228:POKEP+2,24
9:POKEP+6,249
311 POKEP+15,249:POKEP+5,226:POKEP+13,226
330 FORU=8142TO8185:POKEU,1:NEXTU
335 Q=38840:P=8120:FORW=38862TO38862+43:POKEW,1:NEXTW
340 POKEP+9,1:POKEP+11,1:FORW=P+16TOP+21:POKEW,1:NEXTW
350 POKEQ+3,6:POKEQ+4,6:POKEQ+10,6:POKEQ+14,6
351 POKEP+3,232:POKEP+4,232:POKEP+10,232:POKEP+14,232
360 POKEQ+44+18,6:POKEP+22+18,32:POKEP+18,32
370 POKEP+44+18,230
380 FORU=38836 TO38418STEP-22:POKEU,3
395 POKE38880,3:POKE8160,0:IFPEEK(197)=64THEN395
400 FORU=300TO0STEP-1:PRINT"";INT(U/50):NEXTU
410 U=38880:P=8160:VN=36877:VC=36878:J=197:H=190:W=0:Y=0:Z=23:V=0
420 POKEVC,15:POKEVN,220
430 POKEP,3:POKEU,2
436 P=P-22:U=U-22
440 POKEP,0:POKEU,3:FORT=1TO50:NEXTT
441 IFP=7720THEN500
444 POKEP,32:POKEP+22,32
445 GOTO430
500 POKEVN,0:POKEVC,0:U=U+22:P=P+22:POKEP,32
510 FORK=1TOD1:X=INT((RND(1)*395)+1):POKE7724+X,46:POKE38422+X,INT(RND(1)*6+1):N
EXTK
515 A=7720:B=38440:W=0
516 IFV=2THENPRINT"OUT OF FUEL!     "
517 GOSUB50
600 IFPEEK(J)=51THEN1000
610 IFPEEK(J)=20THEN2000
620 IFPEEK(J)=43THEN3000
630 IFPEEK(J)=28THEN4000
800 POKE36878,0
810 IFA>=7900THENPOKEA,32:A=A+1:B=B+1:GOSUB10:POKEA,0:POKEB,3
820 IFA<7900THENPOKEA,32:A=A-1:B=B-1:GOSUB10:POKEA,0:POKEB,3
830 IFW=2THEN9000
900 FORT=1TO40:NEXTT:GOTO516
1000 POKEVC,15:POKEVN,220
1005 GOSUB30:IFV=2THENGOTO800
1010 GOSUB2020:A=A-22:B=B-22
1015 IFA<7680THENA=7680:B=38400
1020 GOSUB10:GOSUB20
1030 POKEA,0:POKEB,3:H=H+10:GOSUB50
1031 IFW=2THEN9000
1035 IFY=2THEN9500
1040 IFPEEK(J)<>51THENPOKEVC,0:POKEVN,0:GOTO600
```



```
1050 GOTO1005
2000 POKEVC,15:POKEVN,220
2005 GOSUB30:IFV=2THENGOTO800
2010 GOSUB2020:A=A+23:B=B+23
2011 IFA<7680THENA=7680:B=38400
2012 GOSUB10:GOSUB20
2013 POKEA,0:POKEB,3:H=H-10:GOSUB50
2015 GOTO2040
2020 POKEA+22,3:POKEB+22,2:FORT=1TO90:NEXTT:POKEA,32:POKEA+22,32:RETURN
2040 IFW=2THEN9000
2045 IFY=2THEN9500
2050 IFPEEK(J)<>20THENPOKEVC,0:POKEVN,0:GOTO600
2060 GOTO2005
3000 POKEVC,15:POKEVN,220
3002 GOSUB30:IFV=2THENGOTO800
3005 GOSUB2020:A=A+21:B=B+21
3006 IFA<7680THENA=7680:B=38400
3010 GOSUB10:GOSUB20
3015 POKEA,0:POKEB,3:H=H-10:GOSUB50
3017 IFW=2THEN9000
3020 IFY=2THEN9500
3030 IFPEEK(J)<>43THENPOKEVC,0:POKEVN,0:GOTO600
3040 GOTO3002
4000 POKEVC,15:POKEVN,220
4002 GOSUB30:IFV=2THENGOTO800
4005 A=A+22:B=B+22
4006 GOSUB10:GOSUB20
4037 A=A-22:B=B-22
4008 GOSUB2020:A=A+22:B=B+22
4010 IFA<7680THENA=7680:B=38400
4015 POKEA,0:POKEB,3:H=H-10:GOSUB50
4017 IFW=2THEN9000
4020 IFY=2THEN9500
4030 IFPEEK(J)<>28THENPOKEVC,0:POKEVN,0:GOTO600
4040 GOTO4002
9000 POKEVN,255:POKEVC,15:PRINT"▒▒RE▒D▒ ▒A▒LERT!
9005 U=INT((8142-A)/22)
9010 POKEVC,15
9011 FORL=UTO0STEP-1:POKEA,32:A=A+22:B=B+22:POKEA,0:POKEB,INT(RND(1)*5+3)
9012 FORT=1TO8:NEXTT:NEXTL
9013 POKEVN,0
9015 FORL=4TO0STEP-1
9020 FORM=180TO235STEP2:POKE36876,M
9025 POKEA,0:POKEB,INT(RND(1)*5+3)
9030 NEXTM
9031 POKE36876,0
9040 NEXTL
9050 POKE36876,0
9055 POKEVN,200:FORL=15TO0STEP-.05
9060 POKEA,2:POKEB,INT(RND(1)*4+3)
9070 POKEVC,L:NEXTL:POKEVN,0:POKEVC,0
9075 POKEA,4:POKEB,3
9080 FORT=1TO3000:NEXT:PRINT"J":GOTO5
9500 PRINT"▒▒S▒A▒FE L▒A▒N▒DI▒NG!
9510 POKEVC,0:POKEVN,0
9515 FORT=1TO1000:NEXT:PRINT"▒
9520 PRINT"▒▒S▒C▒ORE=";E*D;"
9600 FORT=1TO1000:NEXT:PRINT"J":D=D+.5:GOTO5
```


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BRIDGE

COMPUTERS IN CHARGE

BY ALAN HIRON

Perhaps the biggest gulf between the problems of computerising chess and bridge is that in chess there is only one starting position; in bridge, by virtue of the randomness of the deal, there are over 5×10^{28} beginnings.

Fine, the strategies of both games can be defined, albeit in very broad terms. In chess the ultimate objective is to mate your opponent and subsidiary targets are to gain material and/or command of space in order to better your chances of achieving your prime aim.

In chess there is a wealth of literature stemming from any particular set of opening moves.

The bridge objective, on any given hand out of the possible 5×10^{28} plus, can best be put in the following form — a *partnership,* if it has the edge in quantity of material that it has been dealt, seeks to maximise the number of points that it scores.

The scoring is notoriously complex, and discontinuous as well. Achievements have to be gained in two distinct phases. First the pair of hands has to be bid in such a way that the right suit is chosen as trumps, the right level for the contract is chosen and — sometimes — the right hand is the declarer.

Secondly, even having achieved the optimum contract, the 26 cards have to be played in such a way that the maximum number of tricks are taken. Even in that simple statement there are unexpected difficulties.

If your contract is Four Spades — where ten tricks are required. Should you try for a 100 percent chance of ten tricks? Or a 99 percent chance of eleven, with the slight risk of losing all?

That perhaps is mathematically calculable, but there is another curious nuance — it may be *practically* better to play a hand in such a way that a human opponent has an excellent chance of doing the wrong thing rather than stick strictly to the odds. Shades of poker . . .

On the other hand, if the opponents hold the balance of high cards it is likely that your partnership will be cast into a defensive role. Again, this is a multi-stage decision process, the phases of which are inter-related.

1. If at all possible you should cause as much obstruction in the bidding as possible — commensurate with reasonable safety as regards loss of points — with a view to making it as difficult as possible for your opponents to bid their way to their best contract.
2. Sometimes it can be right to make a sacrifice call. After all, if your vulnerable opponents can score 620 points in a contract of Four Hearts, it is worth your while playing in a contract of Four Spades if the cost, even if doubled, is only going to be 500 points.
3. If judgement leads you to defend rather than sacrifice, there are suddenly a new set of problems. It has been said that for every hundred competent declarers at this game, there is only one class defender.

I have mentioned the openings in chess. The corollary, in bridge, is that a defender has to make an opening lead. Certainly this is an area about which several books have been written — mainly guidelines to help improving players — but every hand sets a new problem.

Bridge is very much more a game of percentages rather than absolute facts — except in certain rare situations.

You can hardly say that Karpov gets the first six moves of a Sicilian defence right *most* of the time. He always does for it is a sequence of events that has been well analysed from the same starting position.

By contrast even a world bridge champion can make a disastrous opening lead — and this has been well authenticated!

That was just the opening lead problem — now let us take a hand where a reasonable human defender would have little trouble.

	North	
	10 4	
	A 6 3	
	K Q J 9 7	
	K 6 4	
		East
		A Q 2
		10 8 4 2
		6 4
		10 8 5 2

South opened 1NT (13-5 points) North raised to 3NT and West led the five of spades. All text-book stuff so far and East — the computers were playing all four hands! — correctly won with SA and returned SQ.

No problem, and the contract duly failed as West had led from five spades headed by the Jack and also held DA.

Now some slight changes, and here was the full hand . . .

	10 4	
	A 6 3	
	K Q J 9 7	
	K 6 4	
J 9 7 5 3		A Q 2
9 8 2		Q J 10 4
6 3 2		A 4
9 7		10 8 5 2
	K 8 6	
	K 7 4	
	10 8 5	
	A Q J 3	

Again with computers in charge of all four hands the bidding was impeccable. South opened a weak no-trump (13-15 points) and North raised to 3NT. The lead was fine — even with a sight of all four hands, who could do better than push out S5? — but East fell from grace at trick 1.

All human experts, arguing that they were the defender who was almost sure to get in next, put in SQ — rather than SA. In that way they made it virtually impossible for declarer to hold off — in case West held the Ace — and this led to the straightforward defeat of the contract.

Over to our computer friend in the East seat. Just as before, he rushed in with a rather mechanical SA on the first trick. This would have given a human declarer no problem at all. He would hold off, win the third round of spades and tackle the diamonds. On the lie of the cards West would never be able to get in to enjoy his long spades and the contract would roll home.

Oh dear! In real life the computer South threw back all of the advantage that he had gained and won the *second* spade instead of holding off. Now he had no chance, no matter how the cards lay.

Is this too subtle a problem, perhaps? I don't know — it is an old favourite with examiners who are testing out candidates for their O level examinations in bridge. You can see the built in complexities — if East has most of the outstanding high cards — bearing in mind the opponents' bidding — one play is right, if he doesn't have too much outside and has a reasonable hope of his partner gaining the lead before he does, then his alternative play is correct.

In the next article I will give some thought to how machines can tackle end-game problems. If there are not all that number of cards left per player then an exhaustive search solution may prove enough to crack any normally set problem.

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Adventure

SPANNER IN THE WORKS

When I suggested that both computer and player would recognise treasures more easily if they were identified by a special symbol placed on each side of the word, I threw a spanner in the works as far as object recognition was concerned.

You will remember that the object array O$1 (n) is scanned to compare the three left most characters of each element with the corresponding characters of the second word of the player's response (R5$). How many players are like to type "TAKE *DIAMOND*" complete with asterisks?

A possibility not mentioned so far is enhancing nouns with adjectives, a desirable feature adding colour and mood to the game, "BLOODSTAINED AXE" sounds far more sinister than "AXE", assuming that is the impression we wish to convey!

Yet a player will automatically type "TAKE AXE" rather than "TAKE BLOOODSTAINED AXE". The problem is that the first three letters of the object are no longer the three letters by which we want to recognise it. Notice the similarity to the problem of the treasure asterisks.

String W2$ holds the first three letters of all valid nouns. It would make sense not to duplicate these in the object array, so include only non-object nouns in W2$, such as those used in location descriptions. Assign the rest to an element in O$(n), this array holding the complete descriptions and symbols, and to the left of each description the three letters by which each object is to be identified. See Figure 1. Next concatenate the first three letters of each of the other nouns into string W2$, and to decode the noun:

```
300 FOR I = 0 TO 4: IF R5$ 〈〉
    LEFT $(O$(I),3) THEN NEXT
    ELSE K2 = I : GOTO 400
310 LET C$ = W2$ : LET CC$ =
    R5$ : GOSUB 2000
320 IF I = 0 THAN LET Q1$ =
    "NEVER HEARD OF A ";R3$ :
    GOTO 100 : REM R3$ IS 2ND
    WORD OF PLAYER RESPONSE
330 LET K2 = (I – 1)/3 + 5
340 REM K2 IS 1/3rd OF I PLUS 4
400 REM THIS LINE GOES TO
    ROUTINE FOR APPROPRIATE
    VERB
```

The subroutine at 2000 is the string search given a few months ago, returning 0 if word is not found. K2 holds the coded number of the noun.

Note that if R5$ isn't found in the object array, the scan moves to the W2$ string, and if found k2 = 4 plus the word number found in W2$.

To display the objects visible at the current location it will now be necessary to use only the characters to the right of the three identifiers, which can be isolated by the expression:

RIGHT$(O$(n), LEN(O$(N))–3)

Figure 1

No.	Object description	Key	Contents of O$(n)
0	BLOODSTAIN AXE	AXE	AXEBLOODSTAINED AXE
1	COW	COW	COWCOW
2	JUMPING BEAN	BEA	BEAJUMPING BEAN
3	METAL BUCKET	BUC	BUCMETAL BUCKET
4	GOLDEN FISH	FIS	FIS*GOLDEN FISH*
5	SILVER NEEDLE	NEE	NEE*SILVER NEEDLE*

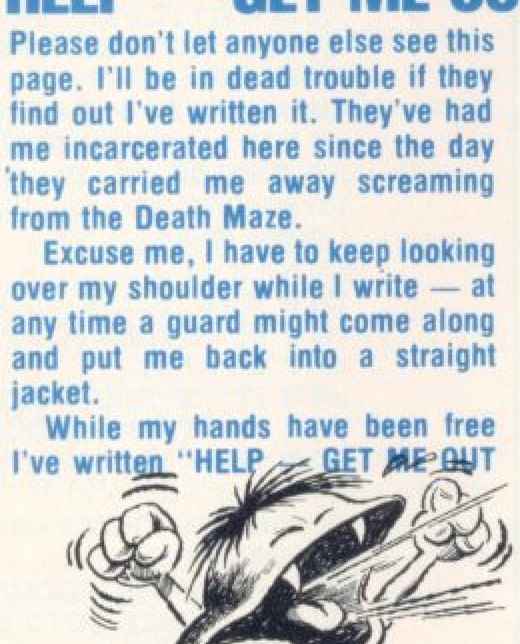
Note that even when the key is the same as the first three letters of the whole description, these must be repeated.

HELP — GET ME OUT OF HERE!

Please don't let anyone else see this page. I'll be in dead trouble if they find out I've written it. They've had me incarcerated here since the day they carried me away screaming from the Death Maze.

Excuse me, I have to keep looking over my shoulder while I write — at any time a guard might come along and put me back into a straight jacket.

While my hands have been free I've written "HELP — GET ME OUT



OF HERE" on the back of a hand-grenade. I'm going to lob it at someone outside, to let the world know where I am. Then they'll HAVE to let me out because everyone will know it's me — and you all know how sane I am.

I manage to get out of my padded cell from time to time. It's a bit disappointing out there, all corridors with doors on both sides and a guard on every corner. I hate it when they catch me, and they always do. They keep taking away my grenade pin and I WANT IT! I WANT IT! Hee hee hee!

Sometimes I fool them by letting the piano fall on my head just before they can pounce!! It doesn't half make them cross! Hee hee!

A man behind one of the doors wants me to let him out. He's promised to kill me if I do. Think I'm stupid? Set him free and he'd be off without a thought for his side of the bargain. Between you and me, I reckon he's a bit of a nutter.

There's a lady in the cell next to him. She keeps laughing in a very high-pitched sort of giggle. They say she's slightly mad, poor soul.

It's so boring here — I can't even read the newspaper I found in my cell — I forgot how to read ages ago.

Please tell me how to get out dear readers, so that I can continue to write for you. Pages of copy as blank as my mind don't go too well with editors. Quick, I hear them coming. My address is "The Asylum . . ." AAARGH!!!

Editors note: Anyone who can help Keith to get out of the Asylum, should write to me with details, at 8 Herbal Hill, London, EC1R 5JB. Do not delay as we need his copy for the next issue!

By KEITH CAMPBELL

PRACTICAL PROGRAMMING

DECIDING ON VARIABLES

Blowing a plane out of the skies is hardly the most constructive thing to program but it forms a basic computer fundamental to many of the dexterity and action games which feature on microcomputers.

Last month we ended with a detailed outline for a simple game program, and we will now look at the process of converting the outline into Basic code. I will be developing the program to run on the Compukit UK101, but I will explain the machine-dependent details to allow you to write a similar program for any machine.

The first step is to decide on the main variables and constants to be used and to determine the initial values to be set up.

If we start with the first line of the program description, "write blank to current plane position" we see that we need a constant to represent a blank or space character on the screen and a variable to represent "current plane position", and we must assign an initial value to "current plane position", the initial value being the top left-hand corner of the screen.

We can work through the whole program description in this way, assigning variable names and initial values, and then write the initialisation section of the program.

If you look at the program listing you will see that the first few lines are devoted mainly to setting up initial values. In line 5, SC = 53248 gives the start of the screen, L = 64 gives the number of characters across the screen, E = SC + 8*L gives the final position for the plane (the end of the nineth line down) and GP = SC + 15*L + 34 gives the position of the gun (the centre of the bottom line on the screen). These values will have to be changed on other machines, for example, on the PET the screen starts at address 32768, there are 40 characters across and 25 lines down the screen, so line 5 would become:

```
5 SC = 32768: L = 40: E = SC + 12*L:
GP = SC + 24*L + 20
```

Line 10 defines the graphics characters used. BL is the blank or space character and 32 is the standard ASCII code for space, used on most home computers. PL, SH, and GN are used for the plane, shell and gun; the Compukit provides suitable graphics for these, for other machines you will have to check the character set.

Line 15 is specific to the Compukit and Ohio Scientific machines, and sets up for reading the keyboard. This line should be omitted on other machines.

Lines 20 and 25 initialise the remaining variables; PP is plane position, initialised at start of screen; PC is the number of planes, initially zero; V is score value; S is the player's score. F and G are the flags "shell fired" and "gun enabled", set initially to indicate that no shell has been fired and that the gun may be fired.

Line 50 clears the screen; although most computers have a "clear screen" command there was no such command on early models of the Compukit.

Line 60 pokes the gun on to the screen and sets up to write the shell immediately above the gun.

We now come to the body of the program, which is written from the program description.

Lines 100 and 110 correspond to the first two lines in the program description:

write blank to current plane position

move plane position one place right

The next block in the program description is:

NOW STUDY THIS LISTING

```
5 SC = 53248 : L = 64 : E = SC + 8*L : GP = SC + 15*L + 34
10 BL = 32 : PL = 237 : SH = 240 : GN = 215
15 POKE 530, 1 : KB = 57088
20 PP = SC : PC = 0
25 V = 100 : S = 0 : F = 0 : G = 1
50 FOR I = 1 TO 16 : PRINT : NEXT I
60 POKE GP, GN : IS = GP - L
100 POKE PP, BL
110 PP = PP + 1
120 N = N + 1
130 IF N = L THEN N = 0 : V = V - 10 : G = 1
140 IF PP = E THEN PC = PC + 1 : PP = SC : V = 100 : G = 1
150 POKE PP, PL
160 IF PP = SP THEN GOSUB 500
170 IF F = 0 THEN GOTO 220
180 POKE SP, BL
190 SP = SP - L
200 IF SP < SC THEN F = 0 : GOTO 220
210 POKE SP, SH
220 IF PP = SP THEN GOSUB 500
230 IF G = 0 THEN GOTO 260
240 POKE KB, 247
250 IF PEEK(KB) = 223 THEN SP = IS : POKESP, SH : F = 1 :
    G = 0
260 IF PC < = 9 THEN GOTO 100
270 FOR I = 1 to 16 : PRINT : NEXT I
280 PRINT "YOUR SCORE IS"; SC
290 PRINT "ANOTHER GAME"; : INPUT A$
300 IF A$ = "Y" THEN RUN
310 END
500 F = 0
510 FOR I = 1 TO 50 : POKE PP, 42 : POKE PP, BL : NEXT I
520 S = S + V
530 PC = PC + 1
540 PP = SC
550 N = 0
560 V = 100
570 G = 1
580 RETURN
```

BY TED BALL

IF end of line THEN set plane position to start of next line
decrease score value
set "gun enabled" flag.

TESTING TIME

So far we have not made any provision for testing when the plane reaches the end of the line. It could be calculated by testing for PP being a multiple of 64 but doing it that way we would have to allow for SC = 53248 being a multiple of 64. It is easier to set up a counter N to record the position of the plane on the line and test for N being equal to the line length. This gives us lines 130 and 140. Note that, because the Compukit allows multiple statements per line we can get the whole of an IF . . . THEN . . . block on one line. In ZX81 Basic we are allowed only one statement after THEN, but we can keep the structure of the program by writing

```
130 IF N = L THEN GOSUB 600
600 LET N = 0
610 LET V = V − 10
620 LET G = 1
630 RETURN
```

Many mainframe Basics allow IF . . . THEN statements only in the form IF **condition** THEN **line number.** In this case we would write

```
130 IF N < L THEN 140
132 N = 0
134 V = V − 10
136 G = 1
```

Continuing to work through the program description, line 140 represents the next block:

IF end of run THEN add 1 to plane count
set plane position to start of screen
set score value to initial value
set "gun enabled" flag

and lines 150 and 160 represent the next two blocks:

write plane to new position
IF hit THEN subroutine (plane destroyed).

The next block is more complicated:

IF shell fired THEN write blank to current shell position
move shell position up one line
IF off screen THEN clear "shell fired" flag
ELSE write shell to new position

We could start by writing:

```
170 IF F = 1 THEN GOSUB 700
```

and expanding the right-hand block inside a subroutine, but I have chosen to start with IF gun not fired THEN GOTO next block. The next two lines, 180 and 190, are straightforward.

We now come to the implementation of an IF . . . THEN . . . ELSE . . . statement. This is available on a few computers, for example the TRS 80 and the B.B.C. Microcomputer, but on most machines it must be broken down into IF . . . THEN . . . and GOTO statements. By using the feature of multiple statements on a line I have kept some of the structure of the program description. However, if only one statement is allowed on a line we must write something like

```
200 IF SP < SC THEN GOTO 215
210 POKE SP, SH
212 GOTO 220
215 F = 0
```

Line 220 is identical to line 160 and corresponds to an identical line in the program description.

The final block in the main body of the program is:

IF gun enabled THEN check keyboard
IF key pressed THEN set initial shell position
write shell to screen
set "shell fired" flag
clear "gun enabled" flag

The method of reading the keyboard on the Compukit and Ohio Scientific machines is rather complicated and I will not go into the details. On most machines we can replace line 240 and the first part of line 250 by

```
240 GET A$
250 IF A$ = "F" THEN . . .
        or
250 IF INKEY$ = "F" THEN . . .
```

This fires the gun when the F key is pressed and ignores all other keys.

The overall structure of the program description is

REPEAT body of program
UNTIL plane count more than number of planes

Line 260 tests for end of game, and lines 280 to 310 clear the screen, print the score, and carry out the usual "another game?" routine.

The remainder of the program is the subroutine in lines 500 to 580, which corresponds to the following in the program description:

subroutine (plane destroyed)
clear "shell fired" flag
simulate explosion on screen
add score value to player's score
add 1 to plane count
set plane position to start of screen
set score value to initial value
set "gun enabled" flag

The only part of this which requires comment is "simulate explosion on screen", which is implemented in line 510. The ASCII code 42 is an asterisk "*", and line 510 flashes the asterisk on and off.

The method of creating moving graphics used above applies to most computers that have a memory-mapped screen. Usually, the last position on one line and the first position on the next line are consecutive memory locations and no special provision is needed to move the plane from the end of one line to the beginning of the next; PP = PP + 1 in line 100 will do this automatically.

However, the ZX81 does not have a memory-mapped screen. There are two ways of creating moving graphics on the ZX81, either by using PRINT AT or by POKEing to the Display File, but in both cases trying to write beyond the end of a line will cause the program to crash.

I have kept the program fairly simple in order to concentrate on the method of top-down structuring for program design and to avoid getting bogged down in details of the code.

However, top-down structuring is extremely important in the design of large, complicated programs that may end up with hundreds or even thousands of lines of code.

By splitting the work involved in writing a program into two parts, first producing a logically structured description of the tasks the program must perform and then writing the code to perform these tasks, the programmer can concentrate on the details of the code in one part of the program without having to worry about how it affects any other part of the program.



SIMPLE SMOOTH CURVES . . .

The impact of a graphic display often comes from a simple, smooth curve which links together all the elements in a picture.

To obtain a particular effect it may be useful to make small variations to the basic shape of a particular curve. These ideas can be illustrated by examining some slightly unusual curves and then seeing how small variations can be added to them.

The location of a point, P, can be described not only by giving its row and column positions, but also by giving its distance, r, from a fixed reference point and the angle, θ, that the line from the fixed point to P makes with a reference direction. This is illustrated in figure 1.

The new co-ordinates are called polar co-ordinates and are written as (r, θ). It is usual to measure the angle, θ, in radians. Polar co-ordinates are the natural way to describe a position in some circumstances, for example, the position of a ship or an aircraft is usually fixed by giving its distance away and its direction.

Now curves can be expressed in polar co-ordinates, and some rather unusual curves are given by quite simple polar equations. As an example, the equation $r = \theta$ describes a spiral.

One revolution of this spiral is shown — in black — in figure 2: it is obtained by letting the angel, θ, take on values corresponding to one turn of a circle. The shape is scaled simply by introducing a scaling factor. Figure 2 also shows one revolution of

$r = 2\theta$ (in red)
$r = 4\theta$ (in blue)

The program that produces these and subsequent plots is essentially as follows. Note that it is written in no particular dialect of Basic.

```
10 P1 = 3.14159
20 FOR TH = 0 TO 2*P1 STEP P1/50
30 R = TH
40 X = R*COS(TH) : Y = R*SIN(TH)
50 IF TH = 0 THEN MOVE X,Y ELSE DRAW X,Y
60 NEXT TH
```

The equation of spiral is incorporated in line 30: by changing this line other curves can be generated.

Figure 3 shows two revolutions of the same spirals as before. If you rotate the page while looking at these spirals you will experience a strange optical illusion. To show another unusual curve, the limacon $r = 1 + \cos\theta$ is plotted in black in figure 4.

Variations on this curve are also shown by giving:

$r = 1 + \frac{1}{2} \cos \theta$ (in red)
$r = + 1 \frac{1}{4} \cos \theta$ (in blue)

This variation seems to remove the unusual characteristic of the curve. However, the next variation shows how to keep it and even to make it occur repeatedly. Figure 5 shows:

$r = 1 + \cos \theta$ (in black)
$r = 1 + \cos 2\theta$ (in red)
$r = 1 + \cos 4\theta$ (in blue)

With this experience of making shapes and loops, we can return to the spiral and give it a ripple of a shape and frequency that we can control. The rippling spirals of figure 6 were obtained by plotting two revolutions of:

$r = \theta(1 + \frac{1}{2} \cos 2\theta)$ (in black)
$r = \theta(1 + \frac{1}{4} \cos 4\theta)$ (in red)
$r = \theta(1 + \frac{1}{8} \sin 8\theta)$ (in blue)

If you would like to experiment to change the shape of some other curves, then the equation of a circle is $r = 2$ and of an ellipse is $r = 3/(2 + \cos\theta)$.

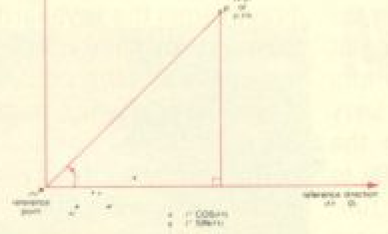

Fig 1


Fig 3

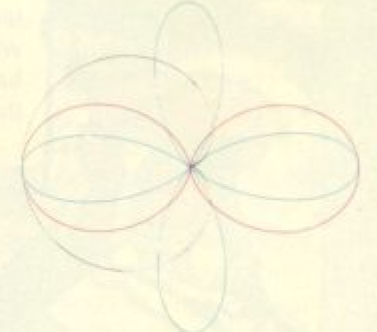

Fig 5


Fig 2


Fig 4


Fig 6

By Gary Marshall

CHALLENGE OF THE SHUTTLE . . .

SPACE SHUTTLE

Taking off in the American Space Shuttle is a challenging task but performing a night-time landing is nearly impossible.

When you load the program "Shuttle Lander" and then type "G400" to run it, there is a picture on the screen of the Shuttle, against some background. It is a good picture given the limitations of the Microtan's 64 × 64 chunky graphics and a 'Y', tells you the length of the runway, 4 kilometres, the maximum landing speed and stalling speed.

The second screen shows you the controls, which are fairly easy to learn.

Select a wind speed, light, moderate or strong and the speed at which the program operates.

The display is split in two, the top part being a cockpit "window" while the bottom is given over to instrumentation.

Providing your directions are lined up together and the distance has fallen below 99,000, a white square appears on the top part of the screen, representing the runway lights.

Once you have mastered the technique you can liven it up by experimenting to find out how high you can go before you have to start descending to avoid stalling. My favourite technique is the "Kamikaze" method which needs quick reactions. As soon as the flight starts, dive at full down elevator, until you are flying as low as possible. Then turn round onto the correct runway heading so that when you reach it your speed is correct.

Shuttle Lander costs £9.37 an.i is from the Tangerine Users Group based in Bournemouth.



HOTEL CHAIN REACTION

COMPUTER AQUIRE

If the idea of setting up a billion dollar hotel chain grips your imagination, try Computer Aquire.

You can either take on the computer, watch the computer play itself or arrange for a friend or five to join in.

Each player begins with $6,000 and six randomly selected hotels. The computer places one of these hotels randomly on the grid for each player. The aim of the game is to select one of your hotels and place it on the playing grid of 120 numbers.

Players have an option of purchasing up to three shares in any chain (providing shares are still available) during their turn.

A strategy game in the Monopoly mould, it is well-suited to a microcomputer taking the score-keeping out of your hands and allows the human players to work out tactics.

The game is based on the board game Aquire and runs on a TRS-80, Apple II and Pet in 16K. I played the TRS-80 version and my main criticism is that it doesn't use the INKEY$ function for entering commands and that, although the packaging is of the highest quality, I do miss the plastic library case for storing the cassette.

It is available from London-based Avalon Hill and costs £12.95.

ALIENS STALK THE CITY RUINS . . .

CROSSFIRE

The invaders have landed on our Mother Earth and are stalking the evacuated city, where your regiment has left you alone with three ships to defend yourself.

They have you surrounded and laser fire is blasting towards you from all directions. Death is certain unless you return their fire, whilst keeping on the move, being careful not to get caught in the Crossfire.

As you only have 35 missiles for each ship, use them wisely making each shot a hit on those uncanny aliens. When your missile strength has depleted to 10, you are alerted by a plinking sound.

You can reload by running over a pulsating pattern of four dots, which will appear in a random position within the city. But be careful not to run blindly into an ambush. The point values vary from 10 to 80 depending on the alien type. Bonus points, 100 to 800, can be earned by running over a stationary graphics character, that appears after every 12 missiles fired, but only remains for a further 6.

If your total reaches 5,000 points then you will be rewarded with an additional ship. For each screen you clear you will receive five less missiles per ship until a minimum of 15 is reached.

This is a very fast-paced arcade style game, using high-resolution colour graphics.

The game can be played directly from the keyboard to suit those arcade buffs who are used to pushing buttons, or by using a single joystick, which in my opinion, is by far the easier.

The only faults that I could find in this game were firstly, lack of loading instructions in the documentation and secondly, the excellent colours of the first wave disappear in the second, being replaced by a single colour, green, which when it first happens, makes you think that the game has finished.

Crossfire requires a 32K Atari and is available on disc only, at a cost of £19.95 plus 50p postage and packing, obtainable from Gemini Electronics of Manchester.



GULP IT'S THE GLOOPER!

VICMEN

Stop the monsters rampaging through the circuits of your VIC in a replica of the popular arcade game.

Vicmen is for one player at a time and he can use either a set of four keys or an Atari joystick.

The object of Vicmen is straightforward. The player must guide his glooper around a maze in order to eat up all the dots. However, there are four monsters in the maze and they are out to eat your glooper up.

There are four flashing white dots and when the glooper eats one of them, he can turn the tables on the monsters.

While playing the game I found a few bugs. Firstly, if you eat a monster just outside his cage, a fifth monster will appear who either comes out after you or stays in the cage. Secondly, when you eat a monster, it turns into a pair of eyes which return to the cage and reverts to the monster form. The fault lies in that these eyes sometimes get stuck and so you only have three monsters after you until the sheet is finished or a life is lost.

Vicmen is an excellent version of the arcade game Puckman and will give hours of entertainment.

Vicmen is well worth £7.00 and is available from Liverpool-based Bug-Byte.

OVERLOAD IMMINENT

EXPLODING ATOMS

Exploding Atoms is a marvellously simple strategy game is for two players on the Sharp MZ-80K. The action takes place on a 6 × 6 grid, where both players place counters. You are not allowed to place your counter on a square occupied by your opponent or last owned by your opponent and you place counters alternately.

The game is about overloading squares. Corner squares overload with two counters, edge squares with three and the centre squares with four. Observant readers will have noticed that these figures correspond to the number of adjacent squares to each type. This is because an overloaded square explodes, sending one counter into each of the squares around it.

And if this causes an adjacent square to overload then that too will explode and it is in this way that a chain reaction can begin.

If your counters explode into a square containing your opponent's counters then that square is turned to your ownership. After some initial sparring, the game quickly becomes critical as each player tries to begin the reaction.

Critical because a miscalculation which leaves just one opponent counter standing is usually fatal! Exploding Atoms comes on the same cassette as Startrek and 3-D Maze it costs £8.00 from Aberdeen-based Knights T.V. and Computers.

NICE, THESE POLISHED PUB GAMES

MISSILE COMMAND, SNOOKER, DOMINOS



The nice thing about Acornsoft programs is you know you are going to get documentation on how to load and run the software.

Games Pack 11 from Acornsoft contains three 5K programs for fully expanded Atoms with 6K of graphic ram, they are Missile Base, Snooker and Dominoes.

The missiles of Missile Command start descending as a gentle shower but after the fourth attack you are in trouble if you haven't got the hang of the sight controls. Due to the lack of a standard joystick for the Atom the sights are controlled from the keyboard, the central rectangle of 36 keys bounded by "2" "z" "0" and "." are mapped on to the screen. The space bar toggles the 4 x 9 keymatrix onto the upper or lower half of the screen.

The V cursor, ctrl and shift keys fire the left, central and right laser bases respectively. The graphics are clean and reasonably fast and the speaker twitters merrily away.

Snooker is a two player game which sports a snooker table with nine red balls, six coloured and a cueball displayed very nicely and quickly, the graphics are excellent. Unfortunately it is a bit like playing on a quarter sized table with full sized balls. The motions are a pleasure to watch, they are strictly Newtonian but slow when more than one ball is moving and because the computer doesn't play the score tends to increment in fours. (Maybe it's because the balls are square?)

Good graphics and fast play are the feature of Dominoes, but not being able to see the computer's pieces doesn't inspire one with confidence in the integrity of the machine, I'm sure it PEEKS at your Pieces!

The Atom displays your dominoes at the bottom of the screen and snakes the pieces in play across the screen.

A good value for money games cassette from Acornsoft, three very polished pieces of software. A shame that the programs did not have any skill and variation options to choose from, as that would certainly increase the audience range.



NOT ENOUGH BOUNCE

BREAKOUT

The dexterity and skills needed to succeed at Breakout are, frankly, beyond me.

Despite- or probably, because of- this I am happily addicted to beating my ball against a multi-coloured layer of bricks. But, even I have certain demands of this simple game, which I was not aware of until reviewing this BBC micro cassette.

I do not expect to see the ball appear to bounce under my bat before returning to the wall. Or to find the top line of the game constantly flickering and wavering just off my telly.

The producers have given we players a choice of six speed levels but I would prefer a greater depth of play-area in which to judge the ball's bounce.

The B.B.C. micro's bright colours almost compensate and I appreciate that the version was rushed out to be the first available software for the machine, but simple unoriginal games need the most thought and care with presentation. Please try again.

Breakout is from Blackpool-based I.J.K Software and costs £3.95.

Kit Korner

CATCHING THE DATA BUS

Ask most people who own a Sinclair ZX81 — or even a ZX80 whether they can directly interface their machine for both input or output and their most likely reply will be no.

They are, of course, partly correct as neither of these machines, and some of the others, do not have interface adaptor chips in them. These chips would allow the programmer to input and output binary information to and from the data bus.

It is possible, however, to input single bit information to these machines with the minimum of hardware, and really it should not be beyond anyone who owns a soldering iron. The trick, if it is one, is to use the strobed keyboard along with the INKEY$ function in software. This may not only be done with the Sinclair machines but with any which has a strobed keyboard. If you have ever used the INKEY$ function you will know how this works. If not, just refer to the manual where it explains it in simple terms.

The principle works in exactly the same way as the keyboard in that the machine looks at each individual switch in the matrix one at a time. By using the INKEY$ function you can test for any number of the keys in the following way:

10 IF INKEY$="*" THEN GOTO 100

where * is any of the lower case keys. As you would suppose you can use as many or as few of the keys as you wish. If you do not input the key that the machine expects it will just move on to the next line of program and to maintain the input mode a "GOTO 10" statement will have to be inserted after the test routine.

One of the most often add-on which uses this method of input is the joy-stick. This is just a switch with a number of positions, usually between 4 and 8.

The joy-stick is of course of use in games as a controller and, if a top switch is fitted, as a laser gun trigger. This arrangement can also be used to plot on the screen in a similar way. Although the strobe method lends itself to this sort of input it can be used for more ingenious purposes.

The best I have seen so far is a burglar system. The inputs were from the microswitches about the house and the tape output was used to trigger a recorded telephone message. Clever.

Now, although you may not have opened up the case of your machine before, if you bought it already built, you only need a little common sense and care not to damage it. You only need to know that 3 screws are hidden under the rubber feet. After the case has been opened two screws are removed to free the board. If you built the kit you will already know what goes where but if you did not a circuit diagram would be of use. The keyboard is the same for both the ZX80 and ZX81 so that the diagram I have drawn below will do for each.

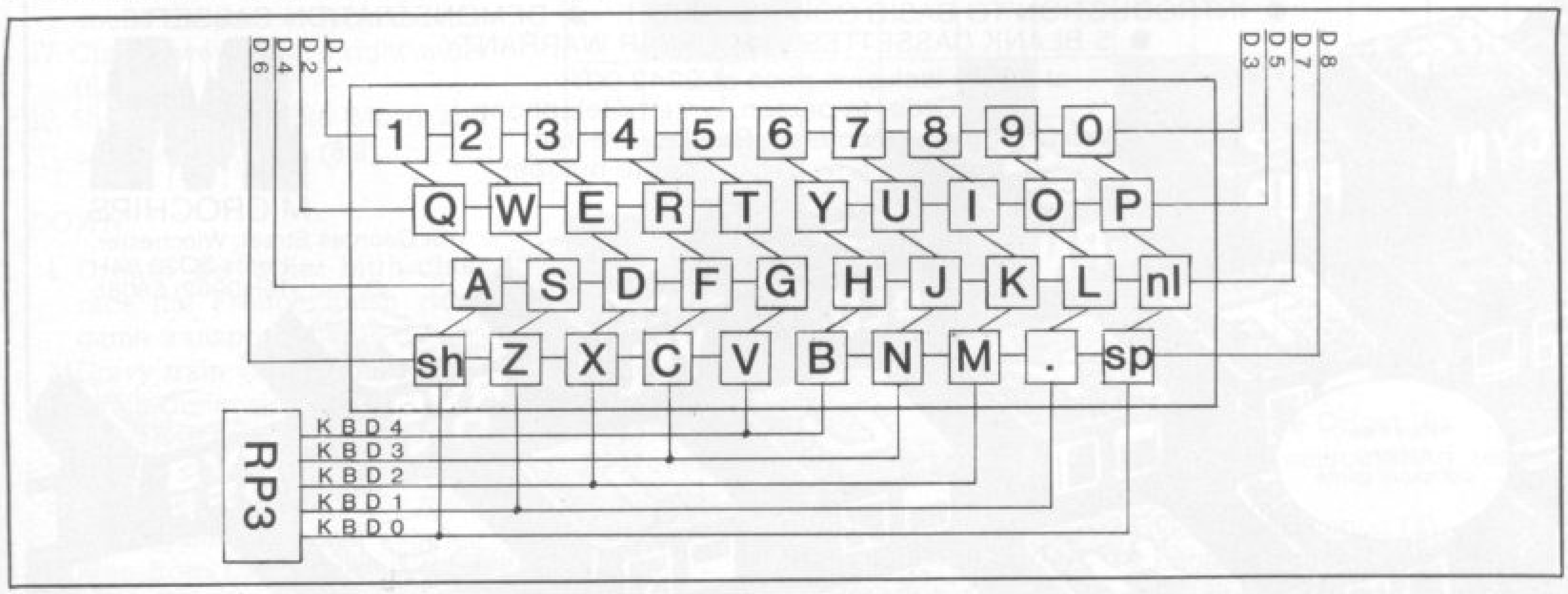
As you can see from the drawing the keyboard is in the form of a double matrix. Unless you are going to use the keyboard as well as the add-on it does not really matter which keys you wire up, as you can always allow for this in the program.

You will see from the picture that for, say, the letter "D" you would wire in on KBD2 and D4, and for, say, the number "7" KBD3 and D3 would be wired up.

You can wire in any of the keys, bearing in mind that you may want to use some keys on the board for auxiliary controls. Remember also that wiring on to the keys does not disable them. To make the system foolproof, you should solder the wires, preferably multi-stranded, on the keyboard side of the diodes and resitors, D1-D8 and RP 3, the resistor pack, respectively.

If you intend to fit a number of different add-ons it would be advisable to terminate the wires in some kind of multi-connector so that you need only plug in the alternatives. Try to standardise on the first one that you obtain or else the one with the most connections so that you do not get caught out with an unusable key.

Whatever you use the inputs for you will find that the machine will no longer be just a simple computing aid but a fun toy and a useful tool as well. It just goes to show how important input/output is when Sinclair's new machine incorporates a powerful command structure for this very purpose. I often wish that other well-established machines



BY KEITH MOTT

Brainware



MIND ROUTINES

During the recent snooker championships the following things were observed about the game.

1. There were no foul shots.
2. No colour (non-red) was potted the same number of times as any other colour.
3. The number of blue balls potted was exactly 3 times the number of brown balls potted.
4. Each player potted the same number of pink balls.
5. The difference between the number of pink balls potted and the number of yellow was only 1.
6. Billy Bashem started the frame and after his eighth shot he had scored 28 points.
7. Roger Rollem immediately followed this with a break of 15 which didn't include a pink ball.
8. At the end of the game Billy Bashem took the pink to draw level and the black to win.



What was the final score?
How many of each ball was potted?

The champagne winners for our May issue's Mind Routines and Nevera Crossword puzzles were: Peter Halkin of Fieldhouse Lane, Marple in Stockport and Vic Burke, Claude Road, Roath, Cardiff.

Bottles of champagne are on their way to both of them.

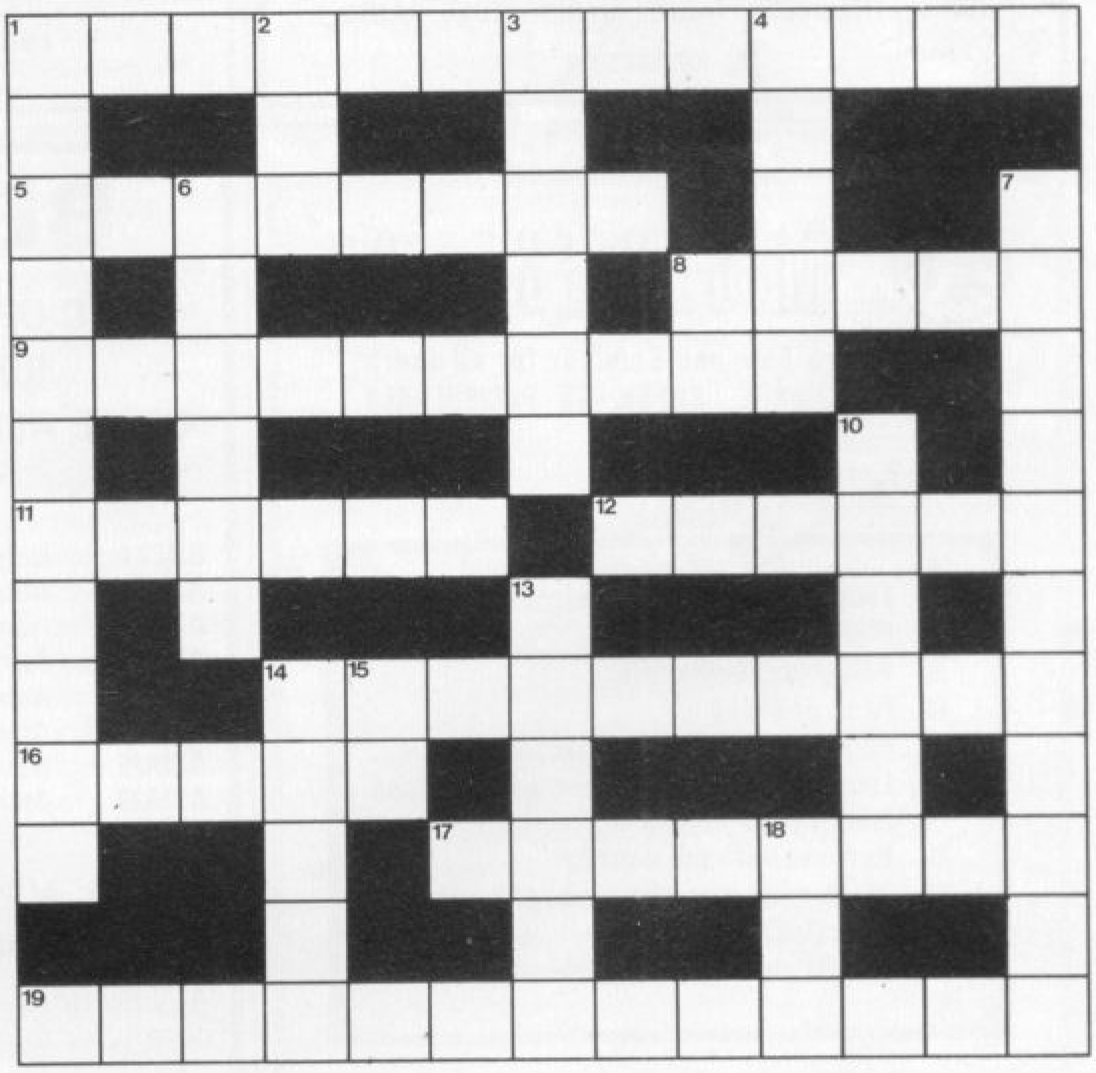
Two more bottles of champagne are up for grabs this month for the first two correct answers out of the hat for this Mind Routines puzzle and the crossword below.

So get your brain into gear and tackle our two teasers this month for some bubbly.

Please send your entries to Computer & Video Games, Durrant House, 8 Herbal Hill, London EC1R 5JB to reach us before June 13.

The answers to our June issue's Brainware problems can be found on page 13.

NEVERA CROSSWORD



ACROSS

1. Oxford street buyer? (8, 5).
5. Butler Biscuit Micro (8).
8. Edit endlessly, fly without a novice — improve the mind (5).
9. Confused MIS Teacher reduced by direct access (5,4).
11. Increased meeting file amendment (6).
12. One down for example French and German articles round the point (6).
14. Victorias go, maybe, mate (5,4).
16. Give a hand to mount glue round the start of Picman (3,2).
17. Cutting way to get a right angle (6,2).
19. Shy sentences like Move and search in COBOL (8,5).

DOWN

1. Dream be quiet-high-class race the French finish video game transport (4,7).
2. Gravy train video game? (3).
3. String dimension (6).
4. Box I'd emptied contained an oxygen compound (5).
6. On which decisions are made about games? (6).
7. Men from Dr. Who trap those in charge of a study of machine intelligence (11).
8. Measure BASIC comment missing start (2).
10. Skilful French move to the right (6).
13. Establish Basic function statement in the Orient (6).
14. Literally surrounding remark (5).
15. Go for promotion (2).
18. Exclamation of 100 Doves eggs (3).

VIC 20 ● VIC 20 ● VIC 20 ● VIC 20 ● VIC 20 ● VIC 20

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A) ALIEN INTRUDER: You awaken to find you are the only survivor on the Explorer Class 3 Starship. Can you escape before you also fall victim to the Alien monstrosity that devoured the crew? There are many ways to end this adventure but only one way to survive!
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MS. PAC-MAN



With the introduction of Ms. Pacman in America especially for female games players, Elspeth Joiner has been investigating whether British distributors are planning an assault on female games players.

It's a well-known fact that far fewer women than men venture into arcades to play video games and have not fallen for the addictive nature of many of them.

But last year American women were caught up in the Pacman fever which raged across the country.

It was the first game that appealed to women as well as men, and as a result of strong and extensive marketing of the game it has gathered a cult following.

Then the American video games manufacturers realised that women are interested in playing — if a game appeals to them.

Now Pacman distributor Midway has created Ms Pacman which was specially aimed at the female contingent. It is identical in concept to Pacman but is a variation on a theme.

Ms Pacman is identified by a red bow in her hair. In pursuit of her are the three familiar faces of Inky, Blinky and Pinky along with the latest recruit Sue.

An extra but nauseating feature of Ms Pacman is a love story — Ms Pacman meets Pacman. It's love at first bite and results in marriage, culminating in the delivery of Pac-Baby. This scenario appears between mazes and takes three acts to perform.

Ms Pacman falls into the cute category of video games. These are much less violent than the blast and zap games of the Space Invader genre.

Manufacturers' research in the States has shown that cute games are more appealing to the fairer sex.

But in England the industry has been slow to give women what they want in video games. So far Bally UK has no plans to introduce the game over here for two reasons — lack of demand and over-exploitation of Pacman.

"We have had expensive and exhaustive sales meetings with dealers but there was no interest in the game," said Bally UK's managing director David Adams.

"It won't go down well in England because there have been so many rip-off games of the original Pacman. Ms Pacman must have been covered in one of them," he added. "Only the red bow is missing."

Now there are so many versions around that Ms Pacman will probably be lost in the crowd.

Another large manufacturer, Taito, is doing little to entice women to play video games. The firm's technical controller Johnathon Lister admitted that few women play video games in comparison to men but Taito was not doing anything to develop new games to attract female players.

The general opinion is that girls are less violent than boys by nature.

Lister said: "The majority of games are now looking at more humourous themes than the space battles and war-games that started off video games. It's the non-violent aspects that appeal to females."

Mike Shaw, associate editor of the US magazine Playmeter agreed: "The introduction of cute games is aimed at increasing the play by women and manufacturers tried to see the response by producing games which are not very much based on violence."

He says judging by the comments from operators and arcade supervisors it has certainly worked in America.

David Adams says: "Women seem to prefer the fun type of games, and the swing is towards more women in the arcades. It always has been a male stronghold but it's a natural progression that more women will be in the backbone of the industry."

"Women have got to design the games themselves, after all they know what they like" he added.

Dave Snook, editor of the trade paper *Coinslot* said: "It is rather averse to the basic female character to be aggressive and you can see it manifests itself in daily life, take motoring for instance."

Video games are also essentially competitive, and women, with several noted exceptions, in general are not as competitive as men.

Locations of video games are not always appealing to customers or condusive to women players and manufacturers admit that they have lost out on the market because of it.

Most video machines are installed in arcade centres which are often seedy in decor, or they are put in corners of pubs which tend to be a male domain.

In America the leisure centres are often situated in shopping malls so it is normal for women to take their kids along for a few minutes when out doing the weekly food shop.

Both Bally and Taito agree that British arcades tend to be unattractive.

Taito has noticed a lot of machines springing up in individual shops and can see the sense of installing them in places like Woolworths or Marks and Spencer.

Yet David Snook reckons that the seediness associated with arcades is a myth.

"The arcades of London's West End and those of other large cities are like chalk and cheese," he said. "Most arcades are now leisure centres and are more up-market than they used to be. Now there are carpets, the places are kept clean and they are generally nice places to go."

New ZX81 Software from Sinclair.

A whole new range of software for the Sinclair ZX81 Personal Computer is now available – direct from Sinclair. Produced by ICL and Psion, these really excellent cassettes cover games, education, and business/household management.

Some of the more elaborate programs can only be run on a ZX81 augmented by the ZX 16K RAM pack. (The description of each cassette makes it clear what hardware is required.) The RAM pack provides 16-times more memory in one complete module, and simply plugs into the rear of a ZX81. And the price has just been dramatically reduced to only £29.95.

The Sinclair ZX Printer offer full alphanumerics and highly-sophisticated graphics. A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. So now you can print out your results for a permanent record. The ZX Printer plugs into the rear of your ZX81, and you can connect a RAM pack as well.

Games

Cassette G1: Super Programs 1 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Invasion from Jupiter. Skittles. Magic Square. Doodle. Kim. Liquid Capacity.
Description – Five games programs plus easy conversion between pints/gallons and litres.

Cassette G2: Super Programs 2 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Rings around Saturn. Secret Code. Mindboggling. Silhouette. Memory Test. Metric conversion.
Description – Five games plus easy conversion between inches/feet/yards and centimetres/metres.

Cassette G3: Super Programs 3 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Train Race. Challenge. Secret Message. Mind that Meteor. Character Doodle. Currency Conversion.
Description – Fives games plus currency conversion at will – for example, dollars to pounds.

Cassette G4: Super Programs 4 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Down Under. Submarines. Doodling with Graphics. The Invisible Invader. Reaction. Petrol.
Description – Five games plus easy conversion between miles per gallon and European fuel consumption figures.

Cassette G5: Super Programs 5 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Martian Knock Out. Graffiti. Find the Mate. Labyrinth. Drop a Brick. Continental.
Description – Five games plus easy conversion between English and continental dress sizes.

Cassette G6: Super Programs 6 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Galactic Invasion, Journey into Danger. Create. Nine Hole Golf. Solitaire. Daylight Robbery.
Description – Six games making full use of the ZX81's moving graphics capability.

Cassette G7: Super Programs 7 (ICL)
Hardware required – ZX81.
Price: – £4.95.
Programs – Racetrack. Chase. NIM. Tower of Hanoi. Docking the Spaceship. Golf.
Description – Six games including the fascinating Tower of Hanoi problem.

Cassette G8: Super Programs 8 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Star Trail (plus blank tape on side 2).
Description – Can you, as Captain Church of the UK spaceship Endeavour, rid the galaxy of the Klingon menace?

Cassette G9: Biorhythms (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – What are Biorhythms? Your Biohythms.
Description – When will you be at your peak (and trough) physically, emotionally, and intellectually?

Cassette G10: Backgammon (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £5.95.
Programs – Backgammon. Dice.
Description – A great program, using fast and efficient machine code, with graphics board, rolling dice, and doubling dice. The dice program can be used for any dice game.

Cassette G11: Chess (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Chess, Chess Clock.
Description – Fast, efficient machine code, a graphic display of the board and pieces, plus six levels of ability, combine to make this one of the best chess programs available. The Chess Clock program can be used at any time.



Cassette G12: Fantasy Games (Psion)
Hardware required – ZX81 (or ZX80 with 8K BASIC ROM) + 16K RAM.
Price – £4.75.
Programs – Perilous Swamp. Sorcerer's Island.
Description – Perilous Swamp: rescue a beautiful princess from the evil wizard. Sorcerer's Island: you're marooned. To escape, you'll probably need the help of the Grand Sorcerer.

Cassette G13: Space Raiders and Bomber (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £3.95.
Programs – Space Raiders. Bomber.
Description – Space Raiders is the ZX81 version of the popular pub game. Bomber: destroy a city before you hit a sky-scraper.

Cassette G14: Flight Simulation (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £5.95.
Program – Flight Simulation (plus blank tape on side 2).
Description – Simulates a highly manoeuvrable light aircraft with full controls, instrumentation, a view through the cockpit window, and navigational aids. Happy landings!

Education

Cassette E1: Fun to Learn series – English Literature 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Novelists. Authors.
Description – Who wrote 'Robinson Crusoe'? Which novelist do you associate with Father Brown?

Cassette E2: Fun to Learn series – English Literature 2 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Poets, Playwrights. Modern Authors.
Description – Who wrote 'Song of the Shirt'? Which playwright also played cricket for England?



Cassette E3: Fun to Learn series – Geography 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Towns in England and Wales. Countries and Capitals of Europe.
Description – The computer shows you a map and a list of towns. You locate the towns correctly. Or the computer challenges you to name a pinpointed location.

Cassette E4: Fun to Learn series – History 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Events in British History. British Monarchs.
Description – From 1066 to 1981, find out when important events occurred. Recognise monarchs in an identity parade.

Cassette E5: Fun to Learn series – Mathematics 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Addition/Subtraction. Multiplication/Division.
Description – Questions and answers on basic mathematics at different levels of difficulty.

Cassette E6: Fun to Learn series – Music 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Composers. Musicians.
Description – Which instrument does James Galway play? Who composed 'Peter Grimes'?

Cassette E7: Fun to Learn series – Inventions 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Inventions before 1850. Inventions since 1850.
Description – Who invented television? What was the 'dangerous Lucifer'?

Cassette E8: Fun to Learn series – Spelling 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Series A1-A15. Series B1-B15.
Description – Listen to the word spoken on your tape recorder, then spell it out on your ZX81. 300 words in total suitable for 6-11 year olds.

Business/household

Cassette B1: The Collector's Pack (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £9.95.
Program – Collector's Pack, plus blank tape or side 2 for program/data storage.
Description – This comprehensive program should allow collectors (of stamps, coins etc.) to hold up to 400 records of up to 6 different items on one cassette. Keep your records up to date and sorted into order.

Cassette B2: The Club Record Controller (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £9.95.
Program – Club Record Controller plus blank tape on side 2 for program/data storage.
Description – Enables clubs to hold records of up to 100 members on one cassette. Allows for names, addresses, 'phone numbers plus five lots of additional information – eg type of membership.

Cassette B3: VU-CALC (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £7.95.
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Description – Turns your ZX81 into an immensely powerful analysis chart. VU-CALC constructs, generates and calculates large tables for applications such as financial analysis, budget sheets, and projections. Complete with full instructions.

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GAMES SAY

BY ARNOLD ARNOLD

"Get 'em before they get me", was the quickfire reply of a Space Invaders devotee when questioned about his optimum strategy.

Another common answer is: "Shoot first and ask questions afterwards." Both are the sign of the loser or those who won't survive for long.

Winning in any game is largely a matter of survival and foresight. The winners are those who understand what is involved and those who last longest. "Winning" in any game is really a matter of outlook.

This and two following articles analyse popular computer, video and other games. Here I am going to describe the best winning strategies for Space Invaders as well as why they should be adopted.

In Space Invaders, as in card games, the facts (i.e. the Space Invaders' missiles) are randomised like a deck of cards. Players are meant to be kept perpetually guessing how best to survive and win.



In Space Invaders, the random or seemingly random program and apparently random missile delivery are designed to confuse the players. Confusion caused by the shuffling of the deck of cards can only be answered successfully by greater confusion created by all players for one another — in other words by bluffing and psychological ploys. But try confusing a computer.

This article examines how best to apply co-ordination. The two following articles will question the part played by luck in gaming and offers a general solution to the chess problem.

Space Invaders provides what seems like a perpetually randomised attack within a constantly moving, yet enclosed, scenario.

Delivery speed of the missiles and their sum and the variety of directions (usually one — downwards from which they come, plus the sum of attacking space creatures, provides the challenge to the player's survival.

So strategies are available to a player. The first is predominantly defensive. The second is predominantly retaliatory. Only the evasive manoeuvre counts where survival is concerned. The retaliatory counter attack is secondary. The limit to the number of retaliatory missiles despatched at any time is a good reason for an essentially defensive posture as the preferred primary strategy.

Games like Space Invaders are addictive only to those people who believe that attack is the only way to win. But that's how you lose in games as in real life. The defensive, primary tactic is always the best as every Karate expert knows. The 'attack first' stance is addictive and usually fatal for those who believe in it despite all the evidence to the contrary.

Those who subscribe to the 'get them before they get me" principle generally lose at the earliest moment — some sooner than others. Those who subscribe to the defensive principle last longest.

Evading the missiles perfectly or relatively perfectly with return fire only when it is safe and effective allows the defensive player to last as long as the programme permits.

The game losing its addictive quality as soon as you have 'conquered' it to the point of playing almost indefinitely. Then it is just a question of how fast you can dodge and reduce the number of attackers from any temporary safe position. You can't win forever, no matter what. At best you can keep going until you tire, run out of time or until the machine breaks down.

These are valuable lessons for games and for life, providing they are properly understood. If you were to keep winning, the only defensive ploy available to the designers of Space Invader programs would be to speed up the program and increase the number and randomisation of the missiles up to the limits of the machine's capacity. Human reactive speeds and co-ordination are far more limited than those of the machine. It has nothing else on its mind. It can't be confused by any player. It also never needs to go to the toilet.

A most interesting Space Invader program would be one for which the player could select and control the speed, randomisation and intensity of the attack, increasing and accelerating missile delivery and randomisation as soon as the challenge of any previous program is met successfully. Or designers could build a progressive series of more difficult games into the program, that you could only play when you have succeeded in less challenging ones. That would enhance the players' co-ordinative skills up to the limits of what is humanly possible. Those limits are known. Computer generated data, displayed on a screen, assumes the characteristics of a continuous beam of light at .027 seconds per unit of display (i.e. per digital dot) as far as human eye-sight is concerned. At that point co-ordination dexterity, evasion and retaliation are of no further use. The little green men will get you every time from the start.

It all comes down to pitting your understanding — even more than your skill — against that of the designer and against a machine's capacity, more than allowing yourself to be tempted to blast the opposition first. The latter course makes for dead heroes. Defence, rather than attack, is the best and most important survival strategy. Never mind a few losses now and then. That doesn't give the defender any advantage in so far as winning is concerned. But he has an equal opportunity to force a draw. That is a game that goes on forever in so far as Space Invaders are concerned.

DOWN TO BASIC

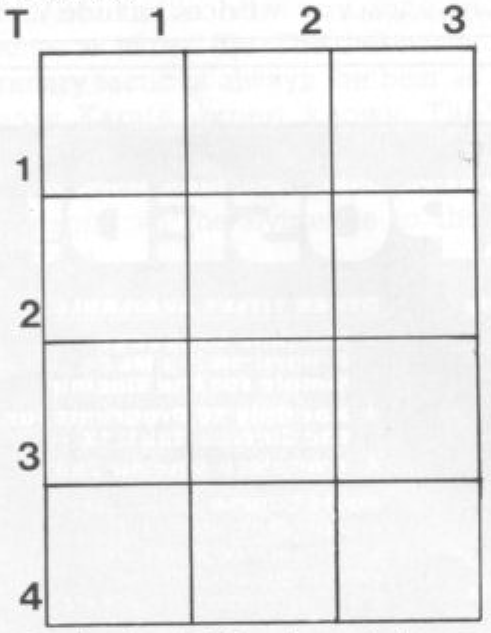
HOW TO WIN THE LEAGUE

Having dealt with one-dimensional arrays (lists) last month, I will describe the use of two-dimensional arrays (tables) this month. The ideas involved are very similar — in the case of two-dimensional arrays tables of related values are processed, e.g. a football league table.

A table will consist of a number of rows and a number of columns. As with lists, the size of a table should be declared in a DIMension statement. The size of a table is specified by the number of rows and the number of columns.

20 DIM T(4,3)

The above DIMension statement would set up a table called T with 4 rows and 3 columns. You can visualise this as



A single DIMension statement can be used to declare a number of arrays — one and two dimensional e.g.

25 DIM L(15),T(10,5)

would set up a list L of size 15 and a table T with 10 rows and 5 columns.

To refer to a particular value in a table, you must specify its position in the table — this is done by giving its row and column position. For example,

40 PRINT T(2,3)

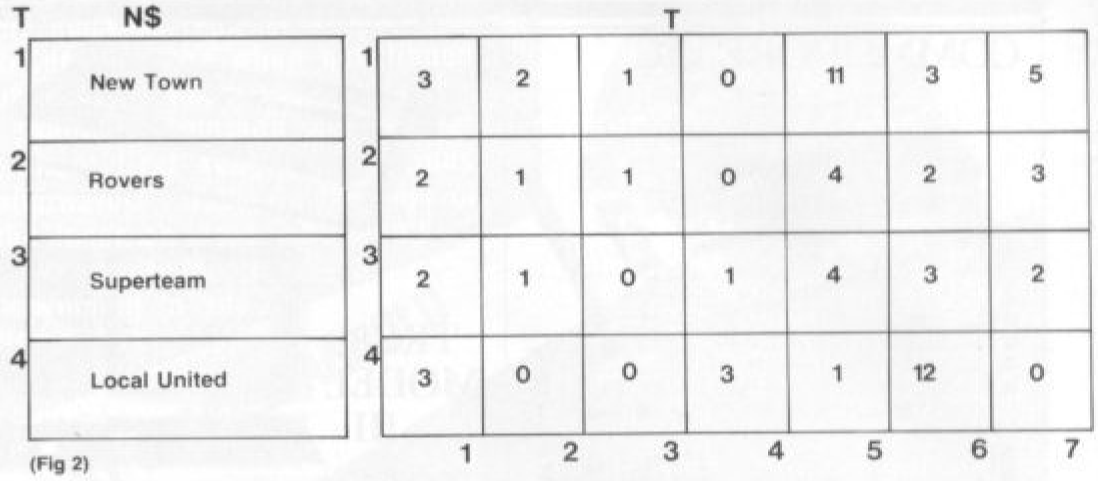
would print the value in the 2nd row and 3rd column of the table T. To show you how to set up a table in your program, I will use the example of setting up the following football league table.

	P	W	D	L	F	A	Pts
New Town	3	2	1	0	11	3	5
Rovers	2	1	1	0	4	2	3
Superteam	2	1	0	1	4	3	2
Local United	3	0	0	3	1	12	0

For each team in the league, there are eight pieces of information to be stored — the team name and the seven associated values. It is not possible to mix character strings and numeric values in one array. I will therefore have a list of character strings for the team names, and a table of associated values.

10 DIM N$(4),T(4,7)

is used to declare a list N$ of four character strings and a table T with four rows and seven columns (Fig 2).



(Fig 2)

Each position in list N$ corresponds to a row of table T — and each row in T has seven columns.

The next problem is how to get the information in the football league table input to N$ and T. Let's input the information row by row.

repeat for each row
  input team name
  repeat for each column (of T)
    input value
  end repeat column
end repeat row

Using variable R to represent the row number and variable C to represent the column number, this can be expanded into the BASIC statements:

```
30 FOR R=1 TO 4
40 INPUT N$(R)
50 FOR C=1 TO 7
60 INPUT T(R,C)
70 NEXT C
80 NEXT R
```

Having input the information in the correct order, the arrays N$ and T would have the form as in Fig 2.

I have only dealt with what would be part of a program to set up the football league table. The remainder of the program might analyse the contents in some way — or it may simply print the table, with appropriate headings, in a format suitable for publication.

THE POLITICAL SURVEY . . .

As another example of the use of tables, consider the following example.

A political survey is to be carried out in the three cities — London, Belfast and Edinburgh. Each person interviewed is asked which political party they would vote for in the next election. Their answer is noted as one of: Conservative, Labour, Liberal-SDP, Other or Don't Know. A BASIC program is required to input the results of the survey and print a table showing the number of people in each of the cities supporting a particular political party.

A code number is assigned for each city and for each Party as follows:

Conservative	— 1
Labour	— 2
Liberal-SDP	— 3
Other	— 4
Don't Know	— 5
London	— 1
Belfast	— 2
Edinburgh	— 3

For each person interviewed, a pair of values will be input — code

BY MOIRA NORRIE

DOWN TO BASIC

no. of Party, code no. of city. The data will be terminated by the pair of values −1, −1. A table will be set up with a row for each Party and a column for each city. As the data is input, each position in the table will contain the current total for the corresponding Party and city. For each pair of data values, "1" will be added to the appropriate position in the table.

Thus, if the pair of values 2,1 is input, then "1" will be added to the value in row 2, column 1 — adding 1 to the current total of people interviewed who support Labour and live in London. The table will continue to be updated in this way until all the data has been input.



```
10 REM POLITICAL SURVEY
20 DIM P$(5),T(5,3)
30 REM SET UP LIST OF PARTIES
40 FOR I=1 TO 5
50 INPUT P$(I)
60 NEXT 1
70 REM INPUT SURVEY DATA
80 REM CODE NO. PARTY, CODE
     NO. CITY
90 REM TERMINATE WITH PAIR
     -1,-1
100 INPUT N,C
110 IF N=-1 THEN 140
120 LET T(N , C)=T(N,C)+1
130 GOTO 100
140 REM PRINT RESULTS
150 REM PRINT TABLE HEADINGS
160 PRINT , "LONDON","BEL-
     FAST","EDINBURGH"
170 REM PRINT TABLE TOTALS
     ROW BY ROW
180 FOR N=1 TO 5
190 REM PRINT PARTY
200 PRINT P$(N),
210 FOR C=1 TO 3
220 PRINT T(N,C)
230 NEXT C
240 REM MOVE TO NEW LINE
250 PRINT
260 NEXT N
270 END
```

There are several ways in which this program could be improved although the basic outline is satisfactory. For one thing, messages should be printed to inform the user as to the necessary format of the data to be supplied — a list of Party names, followed by the pairs of data values.

The major problem would be the appearance of the table of results that would be printed — just how poor that would be will depend on the system used!

What is needed is a method for specifying exactly where values should be printed on a line of output.

Last month some gremlins crept into these pages and some lines of a program — under the heading Now Get Down to Work — went missing. Line 90 should have read LET S=O. LINE 110 IF A(J)=A(J+I) THEN 180. Line 230 PRINT A(I).

ATARI BASIC

The peculiarities of Atari Basic feature in this month's language breakdown.

VARIABLES: The name of a string variable must be a single letter followed by S.

The number of characters in a string variable must be declared in a DIM statement e.g. DIM NS(5) declares a string of up to five characters.

Substrings can be specified e.g. NS(2,4) refers to the substring of NS consisting of the second to the fourth character.

ARRAYS: Can only have numeric arrays

Arrays can be of variable size
20 INPUT N
25 DIM X(N)

The name of an array must be a single letter

STATEMENTS: END statement is optional

Can have more than one statement per line using a ":" as a separator.

The general form of the IF statement is

< line no > IF < condition > THEN < statement(s)>

The ON statement can be used to transfer to one of a list of lines nos. depending upon the value of a given expression

< line no > ON < expression > GOTO < list of line nos.>

FUNCTIONS: ASC returns the ASCII code of the first character in the specified string

CHRS converts code number to character.

FRE(0) returns the amount of free memory space.

FRE returns the number of unused bytes in the space reserved for a specified string variable e.g. FRE(NS).

STRS converts a numeric expression to a character string.

TAN tangent

VAL converts a string to a numeric value plus ABS, ATN, COS, EXP, INT, LEN, LOG, RND, SGN, SIN, SQR.

GRAPHICS: Colour graphics facility commands COLOR, SETCOLOR

GRAPHICS command to determine the number of rows and columns forming the "graphics grid" on the screen e.g. GRAPHICS 7 will give 158 columns and 80 rows.

Gr. 7 is an abbreviated form of the above command.

PLOT C, R plots a point in position column C, row R.

DRAWTO C, R draws a line from the last point plotted to position column C, row R.

SOUND: There is a sound system which can generate varying "noises" by use of SOUND.



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HARDCORE

A GAMES PLAYER'S GUIDE TO THE NASCOM

NASCOM FAMILY

The Nascom family of microcomputers came into being five years ago and has since become one of the most popular hobbyist computers.

Despite the chequered past of its original manufacturers the Nascom name has survived and a third generation of the computer was brought out last year. Now the range consists of the Nascom 1, 2 and 3, each design being more sophisticated than the preceding one.

The Nascom 1 is based around the Z80 chip and is the oldest machine of the range. With over 20,000 sold since its 1977 launch the majority of them are used for process control in industry, and in education as well as having a large following amongst the kit building fraternity. Its main assets are reliability and simplicity of design making it easy to use.

The standard machine has a memory-mapped screen and can handle 48×16 characters. All the conventional interfaces are available including input and output ports, a socket to link up a printer, and a cassette recorder interface. The keyboard contains 47 characters and is surrounded by a steel frame.

You can upgrade the Nascom 1 using the NAS-SYS 1 operating system which comes with the computer when you buy it. This package enables you to use software which was originally written for the more sophisticated Nascom 2. Memory capacity is limited at the basic level to 1K of static user memory.

On the graphics front you can add a small board which provides you with block graphics similar to those available on the Nascom 2. For upgrading further Nascom produces the Buffer Board which makes the Nascom 1 fully compatible with the Nasbus.

This allows you to add the extra system boards including a variety of memory boards and input/output boards, thereby upgrading your system.

Price is an all-important factor in choosing a computer and the Nascom 1 kit costs £125. Nascom also produces a board level version which consists of built and tested boards without cases or power supplies. This is available for the Nascom 2 for £285.

The younger brother of the family is the Nascom 2 which was based on the design of the original machine. Its superiority to the Nascom 1 lies in its extra on-board memory capacity and other additional facilities lacking in the Nascom 1.

It is based on the Z80A/MK3880-4 8 bit microprocessor and runs at a faster speed than the Nascom 1. The board size is also the same as its predecessor being 8in × 12in. Built in memory capacity is 20K which is split up into the following sections. 1K video RAM which is used as a memory mapped video display. 1K work-space/user RAM for programming requirements. 2K monitor Nas-Sys 1 which is the operating system supporting 22 commands and allows a total of 42 user accessible RST operations including character input/output, system reset, relative sub-routine call, input a line and position cursor.

8K Microsoft BASIC is available for the Nascom 2 making it possible to convert programs with few modifications into Nascom BASIC. Nascom has added a number of features to Microsoft BASIC including on-screen line editing thereby simplifying program entry and modification. In an effort to make system modifications and machine code routines simpler Nascom has added the routines DEEK and DOKE which read or write 16 bit integers and complement the usual 8 bit PEEK and POKE commands.

Special routines have been incorporated into Nascom BASIC making sophisticated graphics easy to generate.

The remaining 8K RAM gives the user the option to use both ROM and RAM for additional flexibility.

A 57 character keyboard is the Nascom 2 standard, the extra keys being cursor control keys and another shift key. The machine can be linked up to a monitor or be plugged into a UHF television set, giving a 16 line × 48 character display.

Cassette recorder and printer input/output interfaces are incorporated into the design as well as a parallel input-out (PIO) controller which allows the connection of several peripherals without needing external logic.

The kit form Nascom 2 costs £225 without a user RAM, and £285 for the board level version.

Early 1982 saw the launch of the Nascom 3 in the year after Nascom microcomputers was bought out by Lucas Logic, the computer arm of the industrial giant Lucas. Essentially it is the same as the Nascom 2 but is supplied in cased form. The big baby of the Nascom family is aimed at educational, professional and business users and is the most sophisticated of the range. Now you can use either a cassette recorder or disc drives for leading software and there is a choice of operating systems available.

Two modules can be bought, either 8K or 32K inbuilt memory which can be expanded to 60 kilobytes. The Nascom 3 can be linked up to single or dual disc drives. If you want more than four drives you have to attach extra floppy disc controllers. These come in a case, complementing the Nascom 3 which you can plug into the computer.

Screen-wise a 40 or 80 column 25 line display is available with high resolution colour graphics consisting of eight foreground and eight background colours. Double density two colour graphics are another feature, and you can select a character set and program your own graphics characters.

Coming only in a cased version the Nascom 3 has a starting price of £499 excluding VAT.

All Nascom computers are available from the firm's nationwide dealer network. A list of dealers is obtainable from Lucas Logic, Nascom Microcomputers Division, Welton Road, Wedgnock Industrial Estate, Warwick CV34 5PZ.

FUN AND GAMES

Software for the Nascom range is available for both business and entertainment applications.

Leeds based Program Power is the principal software supplier for the Nascom computer and was set up to market solely Nascom compatible software. Since then it has branched into software for other machines, the Acorn Atom and most recently the BBC Microcomputer.

Amongst the programs on sale from Program Power are games including versions of Lunar Lander, Star Trek, Alien Labyrinth, Space Fighter, Chess, Noughts and Crosses, Super Life, Backgammon, Sargon Chess, Chess, and Othello.

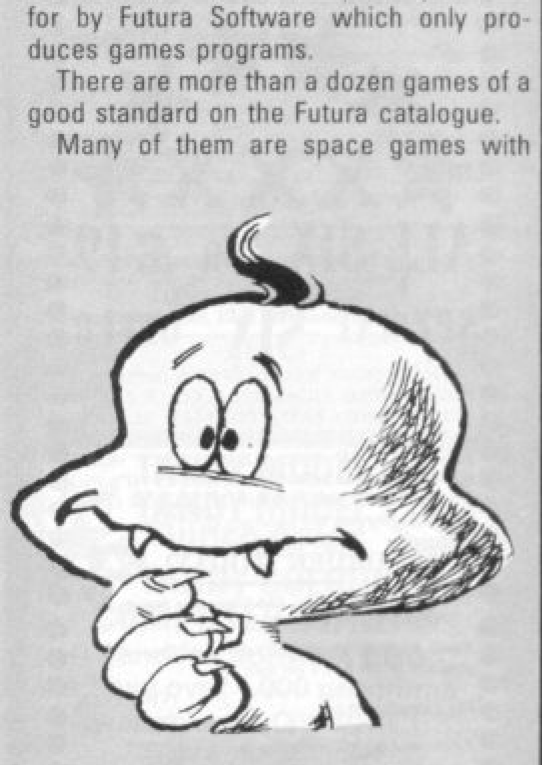
Packages are also available for word processing and personal finance as well as programming aids like the toolbox, graph plotter, vocabulary tutor and Xtal BASIC.

The price range goes from £3.95 right up to £35 which you will pay for the Xtal Basic 2.2 machine code written program. The majority of Program Power's software is written for 8K RAM Nascom computers unless otherwise stated. Products are available mail order from Program Power, 5 Wensley Road, Leeds, LS7 2LX.

Nascom 2 owners are specially catered for by Futura Software which only produces games programs.

There are more than a dozen games of a good standard on the Futura catalogue.

Many of them are space games with



continued on page 82

HARDCORE

continued from page 81

versions of Space Invaders, two games based on the money-spinning film Star Wars. Others include sports games, darts and chess.

Futura Software's prices are very competitive, beginning at £3.50 and going up to £10. The firm can be contacted at 63 Lady Lane, Chelmsford, Essex CM2 0TQ.

Level 9 Computing deals mainly in games but also sells some programming aid packages. For £15 you can buy an Extension BASIC program which adds 30 new keywords to ROM BASIC including find, trace, repeat... until, get, inkey and renumber. It offers the facility of entering your own keywords if you wish. The ROM version costs £25.

A filing software package for use with the G805 disc drive is priced at £25 or in ROM form Q-Dos costs £35.

Games on the Level 9 Computing catalogue include Asteroids, a version of the classic arcade game, a game called Bomber, an adventure entitled Fantasy, and Missile Defence, another arcade style game.

These cost between £5 and £8 and are available from Level 9 Computing at 229 Hughenden Road, High Wycombe, Buckinghamshire HP13 5PG.

Hisoft produces a range of software to help you widen your programming horizon. There is a fast 12K Pascal compiler which produces Z80 object code for £35. A 12K BASIC interpreter called BAS12K with 11 digit floating point arithmetic. On tape only it costs £25. Nasgen is available on tape for £15 or EPROM for £25 and is a fast Z80 assembler. Nasnem is a 2.5K disassembler retailing at £10 on tape and £15 on EPROM.

Hisoft can be found at 60 Hallam Moor, Liden, Swindon, Wiltshire, if you require further information. Another authorised software stockist is Chrisalid at 13 High Street, Berkhamsted.

Business and games software is also available from Lucas Logic. Amongst its products are an assembler, a disassembler, a diagnostic package Nas-Debug for error elimination, a variety of operating systems, and a word processing package.

Prices range from £12 to £45 and can be bought from Nascom dealers.

USER'S VIEW

After two years the Nascom 2 is finally taking off. It had just begun to gain support when the company went into liquidation. The subsequent takeover by Lucas Logic received a lot of attention, however, and the machine is now well established in the middle price bracket.

The Nascom 2 combines the best of its rivals' features. It is a remarkably versatile machine, offering a wide range of features.

The Nascom keyboard is, quite simply, the best I have used, unrivalled by even the £2,000+ machines such as the Superbrain. It comprises 57 keys, including 4 separate cursor keys, giving insert and delete facilities when shifted, carriage return, clear screen and enter keys.

Though not originally designed for game playing the Nascom character set is one of the best. It includes a pixel set — giving a 96 × 48 pixel resolution — playing cards, robots and mathematical symbols — more useful for games than one might think.

The display on the Nascom is memory mapped in a unique format. Basically the screen is 48 × 16 characters; the top line, however, functions as a title and is not scrolled. On either side of the displayed screen is an undisplayed margin that should not be poked to.

The Nascom uses a powerful subset of Microsoft BASIC; the industry standard. It adds extra commands for handling of the screen and machine code. The extra commands are: SET, RESET, POINT, SCREEN, OUT, INP, DOKE, DEEK, MONITOR.

The Nascom, though not primarily designed for home use, is markedly better suited to this task than other machines of the same type, eg PET or TRS80.

MANUAL LABOUR

A lack of Nascom literature is a disadvantage for those unfamiliar with the machine.

Lucas Logic sells manuals with all the Nascom computers. There is a construction manual for the Nascom 1 and a programming manual which both cost £5, and a composite manual for the Nascom 2 and 3 again costing £5.

A book about the Z80 processor, the PIO (parallel input/output) device, and the CTC are priced at £5 each. Other manuals accompany some of the firmware and system software all of which cost £1.

Program Power of Leeds regularly bring out a magazine called Micro Power devoted to the Nascom 1 and 2 which is filled with hardware and software reviews, news from the user clubs, letters, viewpoints and a questions and answers section.

Micro Power is published bi-monthly and for a year's subscription it costs £5.90 if you live in the U.K., £9.80 for European subscribers and £11.80 for the rest of the world. Further details can be obtained from Program Power.

LOTS OF ROOM FOR MORE MEMORY

Room for expansion is an easy option for the Nascom range.

Lucas Logic produce add-on memory boards which will upgrade the Nascom 1 and 2. A RAM B memory card with 16K RAM, costs £80 in kit form and £100 ready assembled. An additional 16K RAM for use with these is £15 while a 32K RAM costs £30.

For the Nascom 3 you have to pay £40 for the 8K user RAM, to add to the Basic system. An additional 16K user RAM for this system is £100.

A variety of input/output boards can be fixed to these computers with options for PIO (parallel input/output), CTC, and a UART, which is a device used to convert transmission from serial to parallel and vice versa. All expansion boards operate on both the Nascom 1 and 2.

A Nascom 2 graphics ROM is available from Lucas Logic for £15 and a character generator is £10. It is made up of a 1K video RAM driving a 2K ROM providing the standard ASCII character set. You can also add simple on-board graphics via a second 2K ROM socket.

A few small firms market their own graphics ROMs, EPROMS, and character generators including: Tuff of Sharbrook, High-Ham, Somerset, which sells a high resolution graphics ROM for £33.50. B. Williams also produces a graphics ROM available from him mail order at 16 Tilston Close, Liverpool L9 6DZ. Graphics EPROMS can be bought from Unicorn and Mortar, 11 Freeth Road, Brownhills, Walsall, West Midlands for £13.80.

Lucas Logic's expansion boards are obtainable from nationwide dealers; an up to date list of them can be supplied by the firm on request.

The RS232 interface allows a variety of printers to be connected.



MEDLEY OF DISCS

A variety of peripherals are on tap for use with the Nascom microcomputer.

The majority come from the manufacturer Lucas Logic and consist of a medley of disc drive systems. A single disc drive unit with 350 kilobytes of memory storage costs £470 while a dual drive system with the same amount of memory per drive is £685.

A disc drive to convert single drive to dual drive retails at £223, excluding the cost of fitting it to the computer.

A 19in card frame has a price tag of £37.50 while the keyboard case for either model is £4.50.

Specially designed for Nascom computers is a cassette data storage unit which costs £99. It is ready built but unboxed and is based on the Philips Mini Cassette with drive unit and interface board. It can handle 100k of data storage and boasts a transfer speed of 750 bytes per second. The maker Ikon Computer Products say it is compatible with all Nascom computers and monitors.

Ikon is based at Kiln Lane, Langharne, Carmarthen, Dyfed, Wales.

SOFTWARE GLOSSARY

A beginner's guide to plain jargon

ADVENTURE: A type of game in which the player has to take a character role and retrieve a number of treasures or objects by a trial and error process giving instructions to the computer. The player encounters a variety of hazards often taking the form of dangerous monsters, wizards and animals. Some adventure games are so complex that they take weeks, or months to solve.
ALGORITHM: A process or set of rules to carry out a task or solve a mathematical problem.
ARRAY: A series of items arranged to form a meaningful pattern.
BASIC: The most widespread computer language which is one of the easiest to learn and is used for programming all microcomputers.
BUG: A slang term given to a mistake in a computer program which prevents it from working. It can refer to a mechanical, electrical, or electronic fault.
BYTE: A term to measure a number of Bits (BInary digiTS), usually there are eight bits to a byte.
CHARACTER STRING: A connected sequence of characters, words or other elements which are usually symbolised with the $ (dollar) sign.
CHARACTER SET: An agreed set of representations from which you can choose to denote or distinguish data.
COMPUTER PROGRAM: A specified set of instructions which perform an operation or task for the computer user.
COMPUTER LANGUAGE: A language is used when writing programs and is vital for making the computer perform operations. A language consists of commands, and computer instructions. There are different types of languages for carrying out different tasks.
CO-ORDINATES: The X and Y points used in plotting graphs.
CONSTANT: A character or group of characters usually representing a value or standard which the computer uses to identify, locate or measure in order to make a decision.
COMMAND: In writing programs this word refers to an instruction word specifying an operation which the computer must perform.
DEDICATED CHIP: A chip — microprocessor — which has been specially programmed to perform a single or special group of applications e.g. computer games. ROMS are usually the means by which dedicated chips are developed.
DISC DRIVE: A peripheral device into which you slot a floppy disc for loading.
DISC: A magnetic storage device.
FUNCTION: A special purpose or characteristic action in a program.
HARDWARE: The general term given to all pieces of electronic and mechanical devices which make up a computer system, i.e. the actual machines.
HIGH RESOLUTION GRAPHICS: Graphics which can be reproduced in great detail or to a high degree of accuracy.
INPUT: Data or information which is fed into the computer.
INTEGER: A number which does not contain a decimal point, i.e. a whole number.
KILOBYTE: A measurement of memory capacity. 1K is equal to 1024 so 8K is equivalent to 8192 bytes.
LOOP: A BASIC function referring to the repeated execution of a series of instructions for a fixed number of times.
MACHINE CODE: The term used to refer to symbols or numbers assigned to parts of a machine. It is the same as operation code which is the symbol telling the computer which operation to perform. When a game is written in machine code — sometimes known as assembly language — it speeds up the graphics.
MAINFRAME COMPUTER: The jargon word used to describe a very large computer, which can store massive amounts of information.
MICROPROCESSOR: Another name for a chip.
MICRO COMPUTER: A tiny computer consisting of hardware and software. The main processing blocks are made of semiconductor integrated circuits.
MINICOMPUTER: A small computer system which gives higher performance rates than a microcomputer, costs more, has a richer instruction set and a proliferation of high level languages and operating systems.
OUTPUT: Data or information which the computer emits, either in hardcopy

SOFTWARE GLOSSARY

A beginner's guide to plain jargon

form (printout) or displayed on a VDU.
PEEK: A statement used in Basic which allows you to read the contents of a specified memory address.
POKE: An instruction used in most versions of Basic allowing you to store integers in a specific place in memory.
PERIPHERALS: Equipment which is used with a computer system, e.g. printers, disc drives, and VDUs.
RAM (RANDOM ACCESS MEMORY): This is a memory chip which you can load programs and data to and from.
ROM (READ ONLY MEMORY): A memory chip which can only be read from and not written into after the initial data has been input.
REAL TIME: This is on-the-spot computing when the operation is performed during the time an event is taking place in time to influence the result.
ROUTINE: A set of coded computer instructions used for a particular function in a program.
SOFTWARE: Another name for computer programs. It can also refer to computer documentation.
STATEMENT: An instruction in a computer program.
SUBROUTINE: A computer program routine that is translated separately and often used several times in one program.
TOP DOWN STRUCTURING: This is the method of splitting up a program into two parts when programming. In larger programs it makes the programmer's task easier.
VALUE: The numerical quantity of a data element, and is the number assigned to a variable.
VARIABLE: A symbol whose numeric value can be changed at all times. It is used when writing programs.
VDU (VISUAL DISPLAY UNIT): A monitor, like a television, which is connected to a computer and is used to display information from the system's memory bank.



AD INDEX

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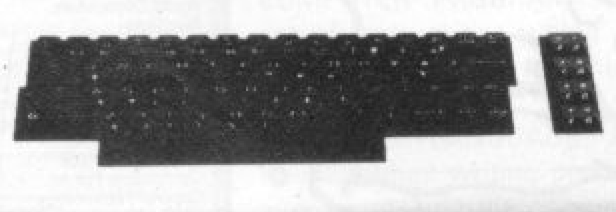
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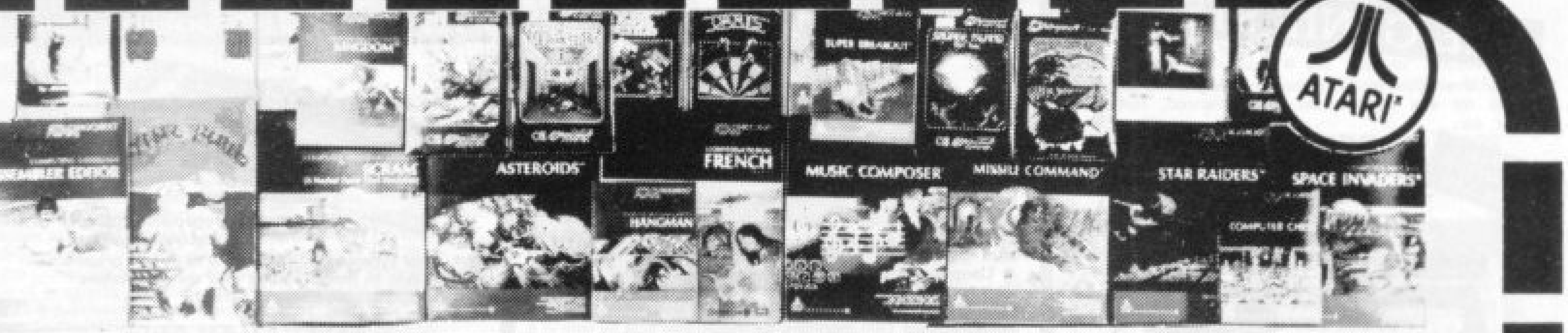
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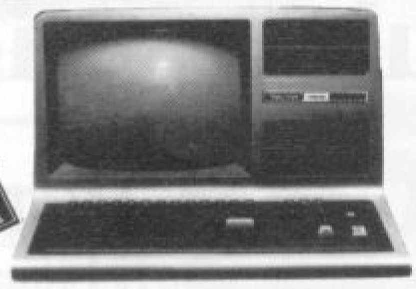
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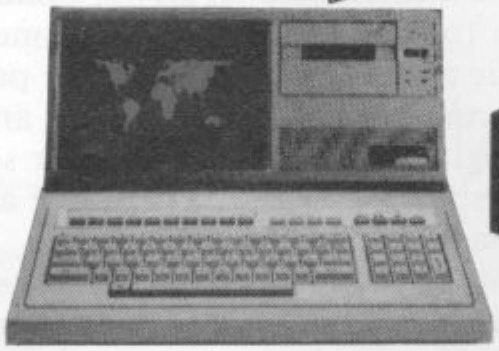
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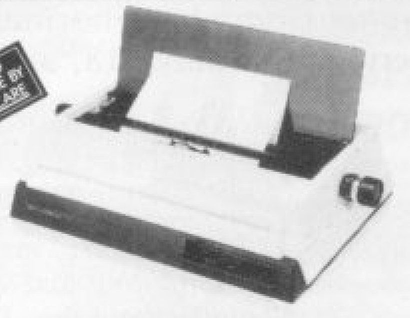
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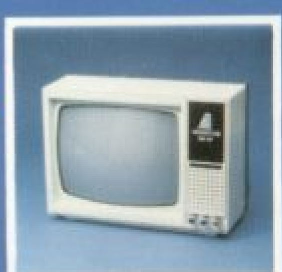
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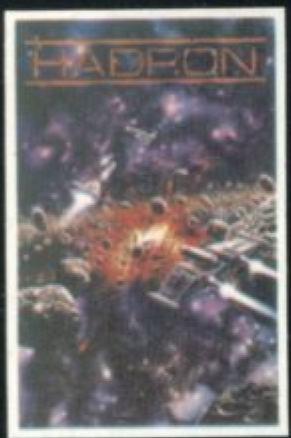
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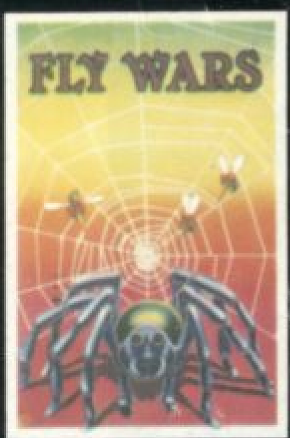
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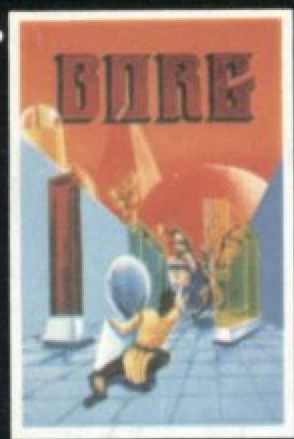
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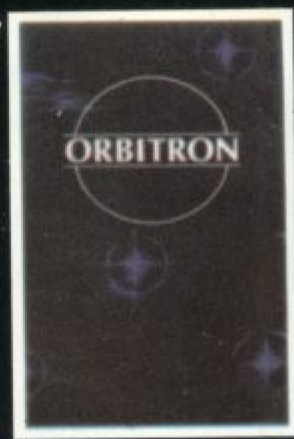
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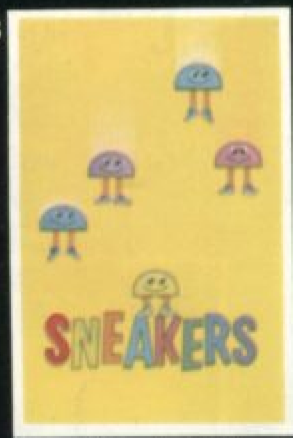
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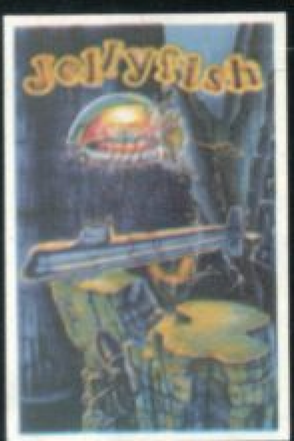
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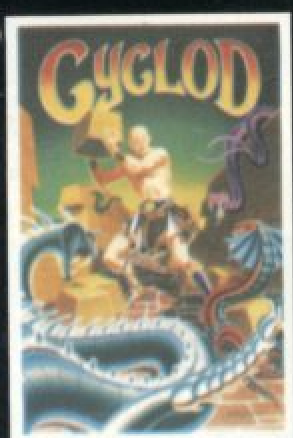
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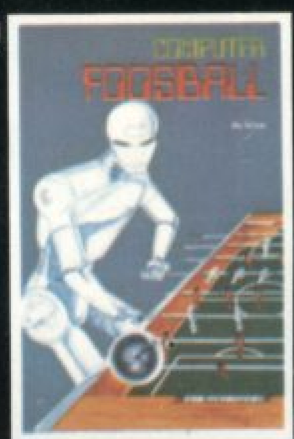
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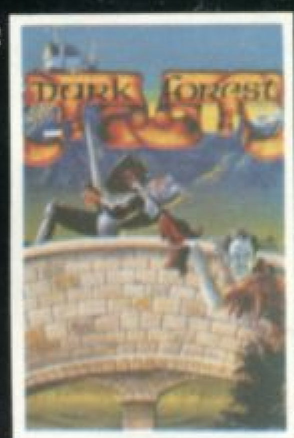
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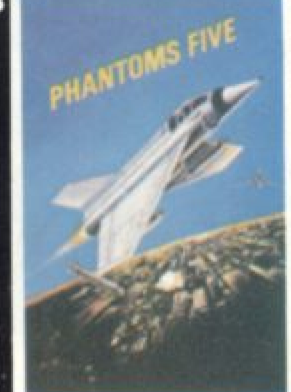
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